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MANUAL
OF
DUPLICATING METHODS
BY
VARIOUS OFFICE MACHINES

BY

W. DESBOROUGH

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PREFACE

THE following pages are intended to promote the more general adoption of the process of "duplicating" for office and other purposes, by pointing out how the defects which frequently lead to the condemnation of the process may be avoided or removed, and by explaining how this convenient and inexpensive method of reproduction may be utilised for a variety of purposes with which it is not at present generally associated.

Three different types of duplicating machines, or appliances, are available for office use, viz.—

(*a*) Stencil machines, both rotary and flat, in which the copy is produced by printing through the perforations made in a waxed sheet;

(*b*) Printing type machines, which are really adaptations to office use of the ordinary printing press; and

(*c*) Composition duplicators, in which the copy is printed from an aniline ink original sustained upon a gelatine or clay.

The machines on the market falling within each class differ in minor features, so that their capabilities do not exactly coincide; and it is, therefore, necessary to select the type and make of machine most suitable to the circumstances or for the intended purpose.

The present volume is mainly devoted to instructions for using the rotary stencil machines, which at present are the type most widely in use. Instructions are given in the methods to be followed to obtain satisfactory results, and the manner of duplicating bookwork, diagrams, sketches, statistical and other forms, and other special applications of the process.

Under ordinary conditions, duplicating is, in many cases, more advantageous than printing. The chief obstacle to the more general adoption of the process has been the imperfect and defective quality of the work usually turned out; and it is one of the objects of this book to remove this drawback, and to enable the operator to produce the most varied and difficult work of good quality.

Except where large quantities are required, the economy of duplicating as compared with printing is very great. Competent authorities have stated that duplicating costs only one-twentieth of the price of printing: probably this may be so when only small quantities are required, but the saving becomes progressively less as the quantities increase. On the average, the saving is at least three-fourths, and it does not reach the vanishing point until quantities exceeding 10,000 are required. For quantities up to 5,000 copies, the balance of advantage is usually in favour of duplicating; and, although urgency or other circumstances may render it necessary to duplicate larger quantities, there are usually counterbalancing drawbacks which make printing the most advantageous process in such cases. For quantities ranging from 20 to 1,000 copies, which are the numbers most commonly required, the magnitude of the economy is undeniable.

Another advantage is the saving of time and, to some extent, of labour. For example, a circular letter can be duplicated in a few minutes and immediately dispatched; or minutes of evidence or other lengthy "copy" can be produced in a few hours: in both cases, in less time than a printer would require to deliver "proofs," whilst the office work in connection with ordering and paying for the printing is abolished.

A third consideration is that, for many documents, duplicating is the most appropriate and efficient method of reproduction. A duplicated circular with a facsimile signature is almost indistinguishable from a separately typed and signed letter, and circulars are the more effective the nearer they approach in appearance to typewriting or handwriting. An ordinary printed letter loses much of its personal character, and therefore obtains less notice. Further, the risk of disclosure of confidential documents is eliminated or reduced if they are duplicated instead of being printed, and the process is specially convenient if for any reason the "copy" cannot be removed for the purpose of printing.

It may be added that this book is not written from the point of view of the makers of the machines, but is based upon a practical experience of duplicating work extending over a number of years.

The writer is indebted to the makers of the machines for kindly reading the proof and making necessary amendments, and for loaning many of the blocks.

W. D.

April, 1917

CONTENTS

PAGE

PREFACE iii

SECTION I

STENCIL CUTTING

CHAPTER I

THE TYPEWRITER

STYLES of Type—Cleaning—Job Slips 1

CHAPTER II

THE STENCIL PAPER

THE Wax—Autographic Stencil Paper—Coloured Waxes . 4

CHAPTER III

CUTTING THE STENCIL

THE Silk Sheet—Cleaning Type—Inserting Wax in Typewriter—Touch of Typing—The Signature—Forms, Tables, and Tabular Work—Ruling the Wax—Maps, Diagrams, Graphs, Sketches, etc.—Cards for Card Indexes, etc. 7

CHAPTER IV

CORRECTING THE STENCIL

STAMPING Over—Smoothing down Wax—Using correcting Varnish—GRAFTING 13

CHAPTER V

RUNNING OFF THE STENCIL

OBSERVATION of Stencil—Lengthening or Shortening Stencil—Stretching over Drum—Developing—Cracks and other Defects—General Running of the Machine—The Ink Supply—Number of Copies obtainable—Using Glazed or Hard Paper—Perfect Registration—Retaining Stencils—Delivery Slips 19

CHAPTER VI

MATERIALS FOR THE MACHINES

PAGE

INKS: To remove Ink Stains from Fingers, etc.—Varnishes—Paper—Brushes—Developing Fluid 25

CHAPTER VII

BOOK and Pamphlet Work—Printing on both sides of Paper—Printing in Various Colours—Overprinting—Octavo Size Work 30

CHAPTER VIII

SKELETON Letter Work—Utilisation of Waste Copies—The Guillotine—The Wire Stitcher 37

SECTION II

ROTARY DUPLICATORS

CHAPTER IX

ROTARY Duplicators generally 43

CHAPTER X

THE Gestetner Rotary Cyclostyle 47

CHAPTER XI

THE Roneo Duplicator 50

CHAPTER XII

THE Ellams' Rotary Duplicator 56

SECTION III

FLAT DUPLICATORS

CHAPTER XIII

STENCIL METHODS

INTRODUCTION—Waxes for Flat Duplicators—Handwriting or Autographic Stencil Work—Flat Duplicator Apparatus—The Neo-Cyclostyle—The Ellams 59

CHAPTER XIV

COMPOSITION DUPLICATORS: CLAY AND GELATINE PROCESSES

PAGE
INTRODUCTION—General Notes—The Hektograph—The Plex—The Grapholithic—The Paper Film—The Tablograph—The Convex Surface—Use of the Copying Press for Duplicating 64

SECTION IV

TYPE-SETTING DUPLICATORS

CHAPTER XV

TYPE-SETTING DUPLICATORS

INTRODUCTION 69
THE Gammeter 71
THE Roneotype 78
INDEX 83
INSET . . . . *between pp.* 74 *and* 75

MANUAL OF DUPLICATING METHODS

SECTION I

STENCIL CUTTING

CHAPTER I

THE TYPEWRITER

MOST modern machines are suitable for stencil cutting, but the quality of the result varies slightly with different makes of machines, and a pad machine (*e.g.*, a Yost) has generally a lighter touch than a ribbon machine. It is not proposed, however, to recommend any particular machine, although a " downward stroke " machine will give better results. Most makers supply a special sharp-faced type with a hard platen for stencil cutting. Unless the machine has a hard platen, it will be necessary to use a special hard backing sheet behind the wax. Good results cannot be obtained with old or blunt-faced type. For a small outlay, the makers will re-type a machine and fit a hard platen. The only disadvantage resulting from using a hard platen for ordinary work is that the ribbons wear out much quicker, but better results are obtained in manifolding. The " strike " of the keys and the tension are also important, and next time the typewriter man calls, ask him to see whether the " strike " is suitable for cutting stencils.

STYLES OF TYPE.

A better style can be given to the work if three different size type machines are used (*e.g.*, *élite*, pica, and large Roman).

Many operators consider that *élite* type cannot be used successfully for stencil work; but with special attention to cleaning, excellent results can be obtained. When ordering a machine with *élite* type, the line spacing should be less than ordinary typewriters by having a 38-cog ratchet wheel instead of a 30. The greater number of letters to the inch and the narrower spacing between the lines will then enable nearly double the amount of matter to be typed on a page. Besides the economy in paper, there is a great saving in time and materials. The saving in cost of production in book and pamphlet work is thus reduced by about one-half.

The smaller type can also be used with advantage for form and tabular work, for foot-notes, and for a number of other purposes where a printer would print in a smaller type, for it is often impossible to type a heading to a column in the required space with ordinary pica type.

THE LARGE ROMAN TYPE can be used for headings, covers of books, and for general display work. The extra trouble involved in transferring the wax to another machine is almost negligible, and the results extend the scope of the process.

"PRINTYPES" (*i.e.*, types with thick and thin lines) cannot generally be used for duplicating, as the heavy face of the type will not perforate the wax—it merely flattens it out. By using a silk sheet and typing very heavily, good results can be obtained, but a large quantity of ink is required for running off.

LARGE CARRIAGE TYPEWRITER.

A long carriage will be required to produce forms longways, and also for Brief work longways.

CLEANING THE TYPEWRITER AND THE TYPE.

The typewriter must be kept perfectly clean for stencil cutting. Every machine which is used for stencils should have a type-cleaning brush tied on to it. *The type should be thoroughly cleaned for each stencil*, and occasionally be cleaned with benzine. If necessary, the letters should be picked out with a pin. A little oil on the brush when cleaning will tend to prevent the types clogging with wax. Special attention must also be given to the rollers, for much of the wax finds its way on to them, and a small piece of wax on one of the rollers will mark the whole length of the stencil, and may cause the wax to turn up irregularly.

The platen and rollers should be cleaned with benzine, and, if necessary, roughed with emery paper to make them bite better. On some machines, the use of the automatic line spacer causes the uneven turning up of the wax. In this case, the wax must be moved up between each line of typewriting by turning the knobs at the end of the platen by hand.

JOB SLIPS.

In order to secure system in a large office the use of Job Slips and Delivery Slips (*see* p. 24) is strongly recommended. Besides being extremely useful for record, repeat, and other purposes, such a system obtains accuracy and individual responsibility among the staff. The Job Slip should be framed to meet the needs of the office, and a suggested form is appended which should be pinned on each job when it is given out, and finally attached to the copy in the record book.

JOB SLIP

No. of waxes ....
No. of copies ....
Reference No. ....
Date ....

Typed by ....
Read over by..........and ....
Duplicated by ....
Blanked (if necessary) by ....
Registered and made up by ....
No. of Waste Copies ....

CHAPTER II

THE STENCIL PAPER

THE WAX.

THE quality of the wax stencil is a most important point in duplicating, yet users of duplicators do not generally satisfy themselves that the waxes are suitable for their requirements. For all rotary duplicators, the stencils are now supplied complete in sets as they are to be put into the typewriter. These sets consist of (*a*) a thin sheet of tissue paper, which prevents the type becoming clogged with wax, and also governs the impression of the type on the wax; (*b*) the wax sheet, which is made by dipping a sheet of tissue paper in wax; and (*c*) the backing sheet, which protects the wax and forms a striking surface, and gives a scale to guide the typist. There are now so many different types of duplicating machines on the market—flat and rotary—nearly all of which use a different style of stencil paper, that it is necessary not only to procure the stencil paper with the correct fitting headpiece, but also of the right grade and quality. There are many different forms of these stencil sheets, although in principle they are exactly the same. The wax is generally made in three different qualities: a thin quality wax for "pad" or weak-striking typewriters, a medium for general use, and a thick for sharp-faced typewriters or hot climates. The form of the backing sheet also varies. A backing sheet with the scale along the top and down each side, and a plain black or green back, is the best, for the scales which cover some backing sheets are very rarely used, and certainly fog one's eyes in reading over the wax; moreover, most typists use the scalebar on the typewriter for horizontal spacing. A photograph of a wax that will best suit most requirements is appended.

When held up to the light, the wax should be perfectly clear; and if little bits of grit, lumps, and other defects appear,

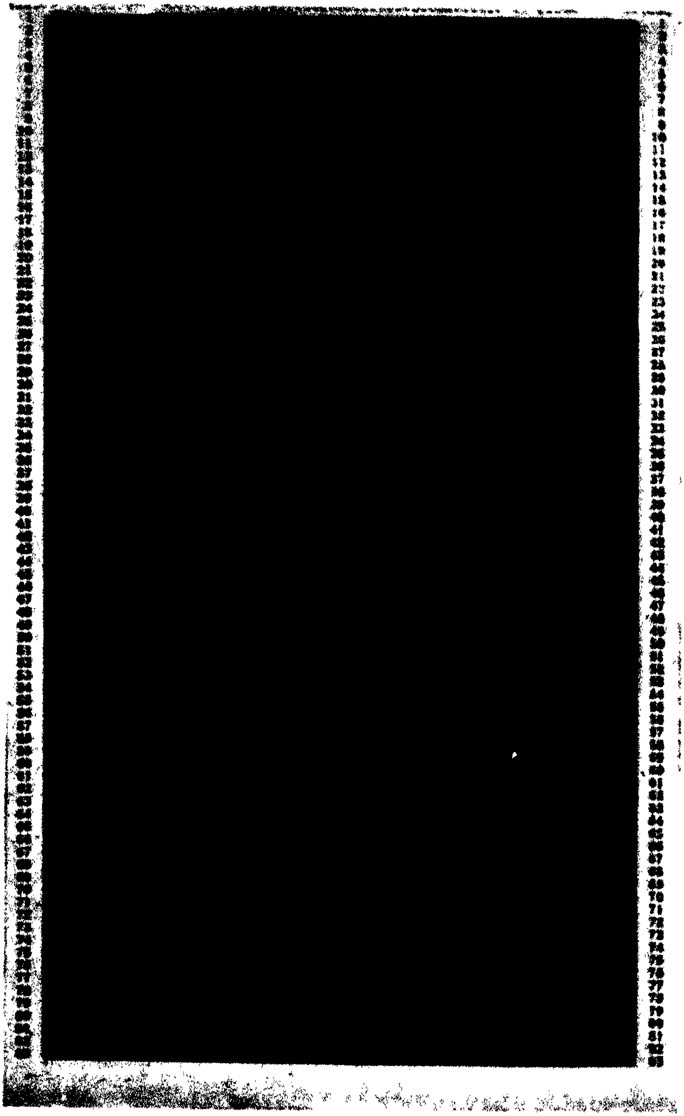


PHOTO OF PLAIN WAX

much trouble will develop when it is being run off, and spots and other blemishes will appear on the copies.

Waxes are subject to climatic conditions, and should be kept in a cool, dry place.

AUTOGRAPHIC STENCIL PAPER.

The stencil paper for handwriting is different from that used for typewriting, although the latter can be used for handwriting (*see* p. 61). There are generally two different grades of autographic stencil paper: one for use with a stylus and a file writing plate, and the other for use with a wheel pen and writing plate. On the hand stencil paper black or blue squares are generally printed as guide lines, but any form or skeleton table for any particular purpose can be printed on the skin by the

THE CARBOFILM OR COLOURED STENCIL PAPER.

When a proof copy of the stencil is required, a sheet of plain paper is inserted underneath the wax, and the impression of the type on a coloured wax will give a copy on the sheet. The illustration below gives a good idea of a stencil with a loose proof copy projecting behind the wax.

If coloured waxes are not used for taking proofs, it is necessary to insert a carbon and a plain sheet of paper behind the wax—preferably behind the backing sheet.

CHAPTER III

CUTTING THE STENCIL

Too much care cannot be devoted to the cutting of the stencil. Before the wax is used, it is desirable to see that there is no imperfection in it, such as a lump or a scratch.

SILK SHEET.

There is much difference of opinion as to the use of a silk sheet underneath the wax. If the face of the type is good, and the platen is not soft, there is no need for a silk sheet, for the omission of the silk sheet gives a very fine cut result. The object of the silk sheet is to collect the wax which is punched out by the type. With any type, the effect of the silk sheet is generally to make the impression heavier. With old or worn type, the silk sheet is necessary to bring out many of the deficiencies of the type which otherwise would not cut through the wax. So, generally speaking, unless the typewriter is very old, the silk sheet is not required. "Pad" machines frequently require a silk sheet, because the "strike" is lighter.

CLEANING THE TYPE.

Before typing each wax, it is essential to clean the type. *This is one of the chief secrets of good stencil cutting*, and it is impossible to obtain a good stencil if the type is not clean. If using *élite* type, clean the type twice every wax. It is also advisable occasionally to clean the type with petrol or some other grease-removing spirit.

TO INSERT WAX INTO THE TYPEWRITER.

If a proof is required, insert behind the backing sheet a carbon and a tissue, or use a coloured wax (*see* p. 6).

Hold the wax at the bottom with the left hand and throw the feed rollers away from the platen by moving the necessary lever. If the wax will not then bite, take out the wax and feed in a sheet of paper, and insert wax over the paper. Adjust the wax straight with the top line of the scale.

Waxes which have to be typed longways must be inserted into the typewriter with the headpiece on the right. This will ensure that the copies will be readable by the operator when coming out of the machine.

The ribbon must now be switched off, or taken out from the ribbon carrier, and the ribbon governor set at neutral. The typing should commence on the wax at the relative distance from the top that it is required on the paper, but no typing should appear in the top inch of the wax. The typing must not extend to the edge of wax, but should be kept within the marginal lines shown on the backing sheet. The length of the typing must also be borne in mind, for if the paper is 10 in. long the typing cannot extend more than 9¼ in., as it is impossible, with a rotary duplicator, to print over the entire length of a page. The extreme length of the typing can usually be reckoned as ¾ in. less than the length of paper, as the capacity of a rotary duplicator will not permit printing on the top edge of the paper.

TOUCH OF TYPING FOR STENCILS.

The touch required for typing a stencil is somewhat different from ordinary work, for all the type letters do not cut the same on being depressed. Capitals and figures should be struck firmer than the smalls, especially "M's, W's, H's, N's"; while "e's, o's, c's," and "stops" must be struck lightly. The touch should be staccato. If too heavy, the letters will be punched out; and if too light, the letters will not be cut. Otherwise type the copy as in ordinary typewriting, but special care must be taken to avoid mistakes, for it must be remembered that every error which is made is reproduced many times, unless it is corrected, as shown in the next chapter. In any case, the correction of errors takes time, and some errors cannot be rectified, in which case the typist's time and the wax are wasted. No lines, other than underscoring, should be done on the typewriter. When the typing is completed, the stencil should be carefully read over and errors corrected on the lines given on page 13. If the backing sheet is covered with scales, and the words of the stencil are obscured thereby, the checking can be facilitated by placing underneath the wax a carbon sheet, which should be stuck on to a thin cardboard.

THE SIGNATURE.

If a signature is required, the stencil should be sent to the official with a stylus and plate; and if the signature is to be printed in a different colour, he should be asked not to sign too near *Yours faithfully* or any other typing near by.

If the signature of the official or manager cannot be obtained, it can easily be imitated by placing a facsimile signature on a piece of paper underneath the wax over a stylus writing plate, and carefully tracing the signature with a stylus or by placing the facsimile signature on the wax over a stylus plate, and writing over it heavily with a sharp-pointed stylus. This method is particularly useful for stock or repeat work and, if done carefully, it is impossible to detect the imitation, for the little shakes of the hand and the lack of "character" which would be so apparent if traced on to paper do not appear on the duplicated copies. In any office where work is done bearing the signatures of certain officials, much time and trouble can be saved if they authorise the reproduction of their signatures by this means on repeat or other approved work.

FORMS, TABLES, AND TABULAR WORK.

The production of forms, tables, maps, and diagrams is usually considered outside the capabilities of a duplicator, but, with care and a little practice, excellent results can be produced; and it must be remembered that in this class of work an enormous saving can be effected over printing and lithography. Until the typist is fairly experienced in tabular work, it is advisable to type the form on a sheet of ordinary paper and then insert underneath the wax, and cut the wax over the typewritten copy.

If it is necessary to do a large number of pages of a table with different figures on every page, it is advisable to rule up a skeleton form and place under the wax, and type in as on a sheet of paper. This will secure uniformity in each page of the table, and will save much time in spacing, etc. If a proof is necessary, insert under the key or skeleton a sheet of carbon and a sheet of tissue.

No ruling of lines should be done on the typewriter. First type the letterpress of the form. The ruling should then be done with a stylus as explained below.

RULING.

Underneath the wax, place a stylus writing plate. The most difficult part of ruling on waxes is to obtain very thick or very thin lines, and a table loses much of its general appearance if all the lines are of one thickness.

Thin Lines are best produced with a penknife, but care must be taken to see that the blade is not too sharp, otherwise strips of wax will be cut out; on the other hand, if the knife is too blunt it will not mark the wax sufficiently, or a jagged line will result.

Lines of Medium Thickness can be produced with the ordinary writing stylus, and they will be more clear and definite if ruled over a silk sheet.

Thick Lines can only be produced by the following method. Select a broad-pointed stylus, place a silk sheet over the wax and the stylus writing plate underneath, and rule over the silk sheet. The effect of thus placing the wax between two silk surfaces (the plate is always covered with a silk sheet) is to remove all the wax along the line and leave the tissue fibre, and the ink percolates through the small holes and spreads evenly on the paper. More definite broad lines can be produced by grinding an ordinary stylus to the shape shown below, and using it over a silk sheet.

Dotted Lines. Dotted lines are often required in form work as guide lines for filling up the form. For this purpose it is necessary to procure from the makers of the duplicator a fine dotted wheel pen similar to the one depicted in the illustration.

Perforation Lines. If a part of a letter or form has to be detached, a local printer would perforate the line for a nominal charge. If only a small number are to be done, they can be perforated with the dotting wheel pen as described above.

Music Lines. A special stylus and plate can be supplied for reproducing these lines.

MAPS, DIAGRAMS, GRAPHS, SKETCHES, ETC.

The production of maps and diagrams on wax may appear to be a very difficult task, yet excellent plans, etc., can be reproduced if the operator has any skill at drawing. The drawing should be done on an autographic wax over a steel file plate as described on page 60. It can, however, be done on an ordinary typewriting wax over a stylus writing plate, but more experience is required for this method, although for some kinds of drawings better results can be obtained. A thin pad of blotting-paper must be used to protect the wax from the heat of the hand. Unless the operator is very experienced, the map or diagram should first be drawn on a hard surface paper and placed underneath the wax for tracing on to the wax. (If using an autographic wax, observe instructions on p. 60.) The point of the stylus is very important and, if necessary, it should be ground on an oilstone to the degree of sharpness required. It must not tear out the wax. If thick lines, or lines of very even thickness, are required, the silk sheet should be placed over the wax with the stylus plate underneath. This, of course, makes it more difficult to see the copy, but the final result of lines thus drawn amply repays any extra trouble. In maps and drawings, it is often better to type in names, etc., after the outline is traced, but great care must be taken to avoid creasing or spoiling the wax in the typewriter.

Cross-hatching is best done with a slightly blunt penknife, and care must be taken to keep the lines parallel.

CARDS FOR CARD INDEXES, ETC.

For card indexes, etc., it is often necessary to print matter almost on the top or bottom edge of the card. With a flat duplicator this is very easy; but a great difficulty arises when using a rotary duplicator, for, as explained on page 8, it is impossible to print inside the top half-inch. This difficulty may be surmounted by duplicating upside down or edgeways.

By using large cards and typing the print several times on a wax, large quantities of cards of all kinds can soon be produced. By running off, say, eight at a time and then cutting the cards by hand or by a guillotine (*see* p. 40), a great economy is effected, and several thousand cards can be printed from the one stencil.

CHAPTER IV

CORRECTING THE STENCIL

The best typists make errors, but, unlike errors on paper, stencil errors cannot be rubbed out, and should not be stamped over. An expert knowledge of correcting a wax is extremely useful: for it not only saves time, but also materials. It is proposed to give all the possible methods of correcting or doctoring a wax, but the only reliable and effective way of correcting a mis-spelt word is by grafting —a process which is not practised to the extent it merits.

STAMPING OVER.

For good work, stamping over is inadmissible, except in certain cases where the letters more or less coincide (*e.g.*, " o " over " c," " l " over " i," etc.). A stamping over can frequently be touched up by painting a little correcting varnish over the superfluous part of the stamping.

SMOOTHING DOWN WAX.

If a word has been mis-spelt or wrongly written, the wax can be rubbed with the finger nail or with any hard smooth surface, such as the end of a penknife, in order to fill the perforations up, and the correct word can then be re-typed. This method is not recommended for good work, as the faking usually shows a little, but it is often useful when pressed for time.

USING A CORRECTING VARNISH.

(*See* " Varnishes," p. 28.)

If the wax is in the typewriter, the tissue over the error should be removed by damping the finger; a thin coat of the correcting varnish is then painted on to fill in the perforations and, when quite dry, the correct word is typed over. If this is done while the wax is in the machine, the varnish generally runs through the perforations to the backing sheet, unless the wax is previously smoothed down as above. Many typists finish typing the wax, and then remove it from the machine to varnish over errors (which should be done with the wax raised from the backing sheet), and then re-insert and type in. A better method of filling up the perforations of a wrongly-typed word is by using a special correcting fluid consisting of dissolved wax in an instantaneous drying spirit. When applied with a brush over the error, a coloured wax deposit is left after the spirit has evaporated. The wax fills up the perforations and the correct word may be typed in, generally with satisfactory results.

This method is also not recommended for high-class work, as the impression of the corrected word is usually slightly different from the rest of the typing, and the corrected word may stand out.

GRAFTING.

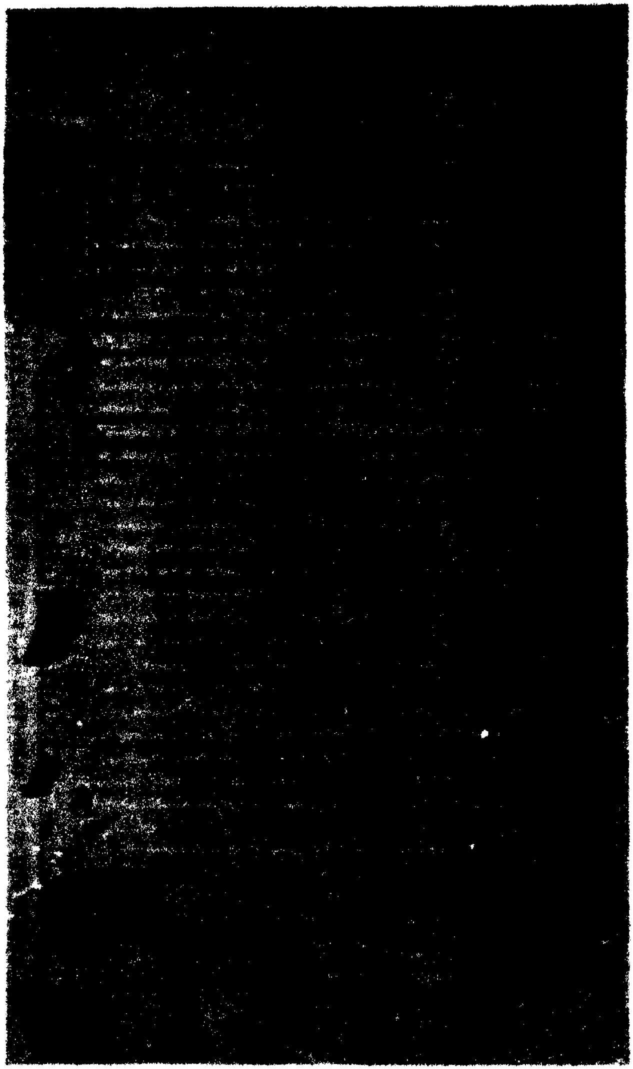
This method of correcting errors is not used to the extent it should be. Most operators are content to stamp over mis-spelt words, or first coat with some varnish and then type over. In the case of words left out, they are generally placed between the lines with a caret. These methods are nearly always unsuccessful, for the effect is apparent on each copy; and again it must be remembered that while the stamping-over of a letter may sometimes be permitted in a single letter, the same error is perpetuated in duplicated work. If grafting is carefully done, it is impossible to detect the corrected parts on the copies. On page 17 is a photograph of a wax with a large number of grafts, and page 18 contains a photo of a copy taken from the same stencil. As the wax is being read over, a list of the errors should be made, and then all the necessary grafts cut on one piece of waste wax. A previously spoilt wax can be used for this purpose many times over if the grafts are always cut at the bottom of the wax, thus using the wax upwards. The tissue sheet should be used each time, otherwise the impression of the graft will differ from the rest of the typing.

The incorrect word should be cut out with a sharp knife, and the edge of the knife should just clear the edge of the type, for the size of the opening should exceed that of the type. If the opening is cut too small, parts of the letters of the graft will not come out in the copies. As a general rule, the graft should overlap the cut-out piece as much as possible, for then there is more wax to hold the graft. To secure this, it is generally advisable, when the incorrect word is near the beginning or end of a line, to graft also the one or two words preceding or following the error. This will enable the graft to be taken well out into the margin, and a larger holding or sticking surface is obtained.

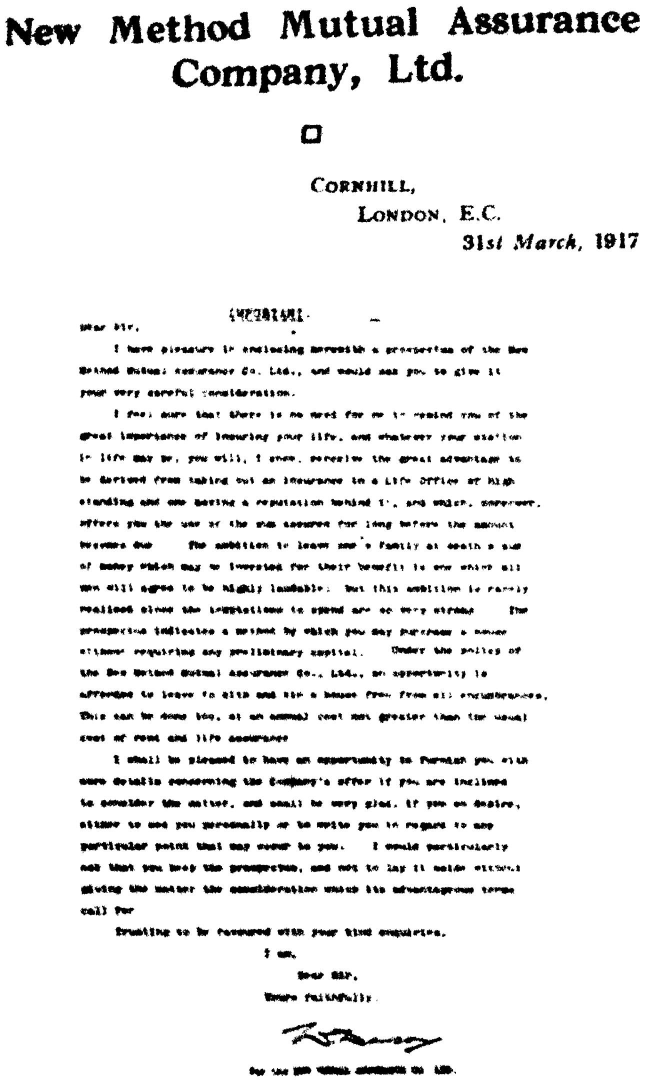
To stick on the graft, the edge of the opening on the wax should be lightly painted with the varnish which is used for general correcting work, and the graft immediately placed on, special care being taken that it is in alignment with the rest of the typing, and also that none of the varnish creeps underneath. In any case, the wax should afterwards be raised from the backing sheet to prevent the graft adhering, which may cause the wax to be torn when placed on the machine. It is advisable to allow the varnish almost to dry before affixing the graft. Then the edge of the graft should be painted round with varnish to close up any possible place through which the ink may creep.

Grafting on single click typing requires a little more skill, for there is obviously very little space for sticking on the graft; and if the graft is cut too small it will not cover the opening, and if too large it will overlap the letters of the line above or below. If there are two or three mistakes in the same paragraph on single-space typing, it is often expedient to graft the whole paragraph. Single letters can, with great skill, be grafted, but a word is usually the minimum that should be attempted.

The extent to which grafting can be done will be seen from this photograph of a wax on which a large number of grafts have been made, as not only individual words but whole lines and paragraphs are grafted in. Attention should also be paid to the strengthening pieces of wax which are stuck on where there is not much hold and where the graft might slip.



WAX SHOWING GRAFTS



New Method Mutual Assurance Company, Ltd.

CORNHILL,
LONDON, E.C.

31st *March*, 1917

IMPORTANT.

Dear Sir,

I have pleasure in enclosing herewith a prospectus of the New Method Mutual Assurance Co. Ltd., and would ask you to give it your very careful consideration.

I feel sure that there is no need for me to remind you of the great importance of insuring your life, and whatever your station in life may be, you will, I know, perceive the great advantage to be derived from taking out an Insurance in a Life Office of high standing and one having a reputation behind it, and which, moreover, offers you the use of the sum assured for long before the amount becomes due. The ambition to leave one's family at death a sum of money which may be invested for their benefit is one which all men will agree to be highly laudable; but this ambition is rarely realised since the temptations to spend are so very strong. The prospectus indicates a method by which you may purchase a house without requiring any preliminary capital. Under the policy of the New Method Mutual Assurance Co., Ltd., an opportunity is afforded to leave to kith and kin a house free from all encumbrances. This can be done too, at an annual cost not greater than the usual cost of rent and life assurance.

I shall be pleased to have an opportunity to furnish you with more details concerning the Company's offer if you are inclined to consider the matter, and shall be very glad, if you so desire, either to see you personally or to write you in regard to any particular point that may occur to you. I would particularly ask that you keep the prospectus, and not to lay it aside without giving the matter the consideration which its advantageous terms call for.

Trusting to be favoured with your kind enquiries,

I am,
Dear Sir,
Yours faithfully,

For the NEW METHOD ASSURANCE CO. LTD.

Photo of a copy taken from wax with grafts.

CHAPTER V

RUNNING OFF THE STENCIL

ROTARY MACHINES

BEFORE placing the stencil on the machine, see if there are any large grafts, in which case it must not be stretched too tightly; or if the typing runs within half an inch of the edge of the wax, in which case it will be necessary to set the stencil over on the machine, so that the marginal typing covers the linen ink pad. Also see whether the stencil is signed, and affix the signature pad as described on page 35. See that the signature has been properly cut; if not, it is advisable to go over the defective strokes with a stylus before placing on the machine.

LENGTHENING OR SHORTENING STENCIL.

If the typing has been placed in the wrong position on the stencil and the operator considers that the head-space pointer cannot be moved sufficiently far to put the printing in the right place on the copies, the wax will have to be lengthened or shortened. With machines which use a head clip and no slots, this is done by sticking a piece of paper on the headpiece and folding over, thus lengthening the wax as much as is desired. The shortening is done by cutting off a piece of the headpiece and folding over. With slotted headpiece stencils, the wax must be cut across just below the headpiece and the wax lapped over to shorten, or an extra piece inserted to lengthen. This simple process is often necessary, and saves returning a stencil for re-typing.

AFFIXING STENCIL.

The machine must then be cleaned where necessary, and the drum should be painted with ink (except in the case of the Gestetner), a 2½ in. or 3 in. flat enamel brush being best suited for this purpose. This painting must be done for every stencil. Then remove the protecting tissue from the stencil. See that the pressure is switched off. Lock cylinder by gear lock. Take the bottom of the wax with one hand, and with the other fix the headclip or adjust the headpiece into the slots or holes. Then with both hands stretch the wax over the drum; the stretching is essential, for if the wax is not tightly fixed, a ruck will appear at the head and the top line of the wax will generally ruck up and crack across. Then tear off the backing sheet, *but not along the perforation lines as directed on the wax.* It is far better to fold the backing sheet back to ½ in. above the top line of typing and *tear off along that fold.* It will be found that most troubles develop on the top part of the wax, the reason being that there is more wear on the part of the wax which takes the initial engagement of the roller with the drum. If the wax has not been typed in relatively the right position, it may be necessary, by means of the headspace pointer, to move the position at which the roller engages on the headpiece (which is supposed to take the initial pressure) to a part of the wax, and in this case trouble will arise. If running off a full page of matter it may be necessary to print almost at the top and bottom of the paper. It is then often better to tear off the backing sheet along the perforation line, and then stick a thin piece of paper over the head to ½ in. above the top line of typing. This will ensure more constant registration and prevent the top line blurring or cracking.

DEVELOPING.

In waxes which are typed without a silk sheet, better results are obtainable if the wax is lightly brushed over with developing fluid. The effect of the developing fluid is to intensify the impression, and experience proves that excellent results are obtained by not using a silk sheet, and lightly using the developer. A rather large camel hair brush should be used for this purpose, a No. 8 size being most suitable.

GENERAL RUNNING OF THE MACHINE.

Then see that the headspace pointer is not below the top line of typing, for it would cause the initial engagement of the roller and drum to fall on the typing, and might crack or blur the line. *If any "o's" or "c's" have been punched out of the stencil, they must be filled in.* For this purpose, take a spoilt wax and type the "o" very heavily, thus punching it out on to the backing sheet. Then pick hold of the centres with a pin and carefully fill up the holes on the stencil. Most of the required punched-out centres can generally be recovered from the backing sheet of the stencil. Then "pull" about three test copies, adjusting the marginal stops and headspace indicator according to the requirements of the job. Touch up with the varnish any spots, cracks, or other defects, and re-develop any capitals or other letters which are faint. If sufficient ink has not been used, and the copies are faint at any particular place, paint a little ink on the inside of the cylinder at the place, or raise the stencil and paint outside of the drum. Look at the bottom of the wax to see if there are any defects, for these, being below the length of the page, would not come out on the copy, but would come out on the back; the reason for this being that this part of the wax engages with the roller, which, in turn, prints the defect on the back of the next copy. Do not attempt to insert on the plate too much paper. A pile about three-quarters of an inch high is about the maximum. The paper should always be separated, especially if relief stamped or printed, by flipping the top edges apart by bending over, or by running the thumb across them: this is necessary to prevent the sheets slightly sticking together which interferes with the proper feeding. The paper must then be inserted tightly between the stops. Proceed to feed paper and run off according to the instructions given with the machine, taking note of the number on the cyclometer. It is a fallacy to suppose that the duplication of the copies then resolves itself into turning the handle. It is often possible, of course, to run off 500 copies without any "troubles," but experience will prove that, generally, the stencil requires some doctoring or the machine needs some attention. Watch the work carefully and rectify any defects which may develop, and do not—unless the quality of the work is absolutely immaterial—allow cracks and blots to pass unrectified. Any large cracks which occur should be painted with the varnish and a small piece of wax or paper placed over. It is often necessary to varnish between words or letters, and a fine brush and good thin varnish are required.

THE INK SUPPLY.

Watch carefully the inking of the copies, and guard against a small piece of paper which may be mixed up with your supply, getting on to the wax and covering a portion of the typing. If using a different colour of ink for the signature, etc., see that it is inking properly, and lift up the wax and re-ink when required. If the linen pad over the drum is not very new, it may be that the copies will get rather faint after about 300 have been run off, and the operator will fail to get ink from the reservoir or other inking arrangement to percolate through. The only thing left is to lift up the wax and re-ink with a brush. If it is a long stencil with ruling and grafts, this operation must be done with great care.

The number of copies which can be obtained from one stencil varies with the quality of the wax, the amount of typing, the surface of the paper used, the temperature, the "truth" of the machine, and the skill of the operator. With an ordinary foolscap page circular on glazed paper, 3,000 to 4,000 copies can be obtained; but, with an absorbent paper, the average number of good copies of a full page of typing which can be obtained is about 2,000, whilst 3,000 of, say, a 16–20 line circular can be done. Of course, if the machine is raced, and the paper feeds through crumpled and the stencil is generally not taken care of, the stencil may be useless after the hundredth copy.

USING GLAZED PAPER.

When using a glazed surface paper, the copies must be run into a blotting book. The work must be frequently examined, for otherwise many books may be filled with copies which are useless. Unless the work is required immediately, these books should be left some time to dry, usually about four hours, but varying according to the drying powers of the ink and the absorbent quality of the leaves of the blotting book. If the work is not required urgently, it is not advisable to use a very absorbent blotting book, for much of the ink is then removed, and the impression obtained is very weak. Drying books of thin strawboard are now made, in which copies take some time to dry, but the result is much superior. Post cards, cards, envelopes, small sheets, etc., cannot be automatically fed, and will have to be fed by hand.

PERFECT REGISTRATION.

If the work is skeleton form or letter work, parts of which have subsequently to be matched in by a typist in duplicate, the copies must be in perfect registration (*i.e.*, the position of the print must be in absolutely the same place on each copy), and the machine will have to be set for hand-feeding. Automatic self-feeding rotary duplicators do not print in perfect registration and, even when set for hand-feeding, they are not absolutely correct, but are generally sufficiently accurate for most work. The flat duplicator will have to be used if all the copies are required absolutely in perfect registration (*e.g.*, overprints in a different colour of maps, diagrams, etc.).

When the copies have been run off, remove the stencil. If it is left on the machine, it may adhere to the linen and clog it.

[*See* also Notes on page 43, and Special Notes concerning the machine used.]

RETAINING STENCILS.

It will, no doubt, surprise many to learn that stencils can be preserved and used several times, even after some years have elapsed. All that is required is a few lifts (*i.e.*, twelve double sheets) of blotting paper. Take, say, four lifts of blotting paper and place one inside the other, making a book. On the outside, place a sheet of brown paper and sew with string down the back, like a section of a book. The sheets should then be numbered consecutively on every other page. For convenience, the outside of the book can be lettered A. When a wax is taken from the machine it is placed in the book, and the reference number of the wax will be A1, A2, and so on. If the work is being done by a branch which works for all departments of the office, one copy of the job should be placed in a file cover and numbered in the corner A1 500 copies. A delivery slip should then be pinned on the job in a similar form to this—

Mr. . . . .

. . . . Department

. . . . Copies

If further copies of this print are required, it is necessary to quote . . . .

Date . . . . 19. .

PLEASE RETAIN THIS SLIP AT THE BOTTOM OF THIS SUPPLY.

If, after a lapse of several months, a further supply of this print is required, the trouble of cutting a new wax, reading over, etc., will be saved; and a further supply can be produced in a few minutes by turning out A1, A2, or whatever the reference number is. The necessity for duplicating surplus copies to meet unforeseen needs is thus obviated, and a very large economy in paper is thereby secured. This system of retaining and registering waxes is strongly recommended to offices where repeat orders are frequently given, and, crude as the method of keeping the waxes may seem, it is very suitable and convenient, and a more elaborate method could not be more effective: a large number of stencils can thus be retained in a minimum of space, and can be referred to with the greatest ease.

See also Job Slips, page 3.

CHAPTER VI

MATERIALS FOR THE MACHINES

INKS.

THE ink is the most expensive item in the upkeep of a duplicator, but it is inadvisable to economise by using a cheap make. It is customary to use the ink supplied by the maker of the machine, but there are one or two manufacturers who make excellent ink suitable for any make of machine. Most users of duplicators use a purple ink, and for general circularising this is most suitable; and with a black signature, and the name, address, etc., matched in, an excellent imitation of a personal letter is obtained. If required for matching work, the ink which is being used on the duplicator should match the ribbon in the typewriter, for insertions must not be too apparent, otherwise the personal character of the letter is lost. The maker of the duplicator will probably be able to supply a ribbon to match the ink. In any case, when matching in, it is generally necessary to type very lightly.

There are two distinct kinds of inks used—one with an oil basis, and the other with water and glycerine, or substitute. Oil ink is always used with a flat duplicator, with the Gestetner, and sometimes with Ellams' Rotary; while Roneo's use a water ink. It is, of course, impracticable to change these inks, although Ellams supply either an oil or a water ink for their rotary. For varied work, the water ink possesses advantages over oil. In the first place, the water inks generally dry more rapidly and without a " halo " of oil round the letters. A very opaque paper is consequently required for duplicating on both sides with an oil ink; but oil inks have been considerably improved recently and the halo does not appear in many of the better qualities. In the second place, a water ink is better if using a hard surface paper, for the oil inks will not dry on this paper. In the third place, it is impossible to smudge water ink copies, whereas some oil inks will smudge even after two or three years; and lastly a larger number of copies can generally be obtained from a wax when using water ink. The main advantages that oil inks possess are that a deeper black can generally be obtained than with the water ink, as the former is similar to printers' ink—carbon and oil; whereas the latter is always a "chemic" black; oil ink does not "dry" on the machine, which makes the machine always ready for service; and a sharper impression is obtained.

In a large office it is advisable to have some machines black and some purple, and, if necessary, some of other colours. For occasional two or more colour work, a few bottles of the coloured signature inks will suffice, and the different colour can be produced as shown on page 35.

TO REMOVE INK STAINS FROM THE FINGERS, Etc.

The purple duplicator water inks are generally made from an aniline, and the stains are very difficult to remove from the fingers. *Cleanine*, or other ink remover which is made by the maker of the machine, is the best means of removing the ink. If any of the violet ink gets [illegible] the clothing, take a clean piece of rag, dip in *Cleanine*, and rub till most of the stain has disappeared. Then rub with soap and water, and the stain will be mostly removed; and if the clothing is made of a washable fabric, the stain will probably totally disappear at the laundry. *Cleanine* is not necessary with black or with most of the oil inks, as these can be removed with soap and water. This ink remover is sometimes made up in the form of a paste, but it is not so economical in use, and cannot be used for clothing so successfully as the liquid.

VARNISHES.

There are, on the market, many makes of varnish for use with waxes, and it is usual to use the make supplied by the maker of the machine; but it must be pointed out that cheap varnish is false economy. The cheap makes simply consist of a spirit varnish—usually shellac and pyroxlin dissolved in methylated spirit. They are consequently rather slow in drying, and before the bottle is half used they lose their spirit and become very syrupy and useless. The better qualities contain an instantaneous drying spirit—frequently methyl ether—and are very quick drying, and if kept properly corked can be used down to the last drop in the bottle. But care must always be taken to keep the bottle well corked, otherwise much of the spirit is lost, and the mixture becomes very thick and slow in drying. A varnish which dries hard quickly, saves quite a considerable time in use, for if it is necessary to wait several minutes for every obliteration to dry when running off, the total time lost per bottle is considerable; and if the machine is turned before the varnish is dry, the paper will stick to the wax, and a large piece of wax may be pulled out.

It is also advisable to have a slightly tinted varnish, for it enables the operator to see how much varnish is being used and whether the crack or graft is sufficiently covered. Another important point in varnishes is the method of bottling. Varnish is best put up in ounce bottles, with a very small brush, reaching to the bottom of the bottle, fitted into the cork. If the cork is too small, it will soon break, and, if too large, it allows of the more rapid evaporation of the spirit.

Several makers supply various kinds of varnishes for different purposes. One is called a protecting varnish, another an erasing varnish, another a correcting varnish, and another a correcting fluid. For practical work, these grades are unnecessary, for if the best is used it will answer all purposes; but the use of a correcting fluid or " Fill-wax " consisting of dissolved wax in a spirit, for correcting a wrong word without grafting, gives better results for this purpose than the usual varnish. In a large office there is always a certain amount of waste (*i.e.*, when the operator has failed to keep the bottle properly corked): this should not be thrown away. It can either be used as a protecting varnish or, better still, poured into a large bottle and methyl ether added, when it is fit for use again; or it can be mixed with the varnish in a new bottle.

PAPER.

The impression paper for duplicators is very important; and, unless style is immaterial, the commonplace blotting-paper variety should be dispensed with. A paper which is very absorbent gives a blurry impression, takes a large amount of ink, and renders the wax so fluffy that only a limited number of copies can be pulled. On the other hand, a thick, hard surface paper is sometimes difficult to work, it has to be run into blotting books, it takes some time to dry, and the books have to be emptied. It gives, however, a sharp impression, and admits of the maximum number of copies being obtained from the wax. For general work, a paper which is slightly absorbent but sufficiently so to enable the copies to dry within ten minutes and prevent much off-set on the back, is the most useful. In a large office it will be found expedient to stock several qualities of paper. When circulars are repeatedly being done for various firms or departments, the style of the work will be considerably improved if a stock of headed paper is kept. Other styles, sizes, thicknesses, and qualities suitable for the particular office should be stocked. The sizes should, however, be standardised, so that the follow-on sheets of a headed paper will be the same size. The following are good standard sizes: 16 × 13 for brief; 13 × 8 for foolscap; 10 × 8 for quarto; 8 × 5 for octavo. All paper for duplicating should be well-trimmed, as uneven supplies give rise to much trouble in the machines. Printed headings give less trouble in feeding than die-stamped headings. Coloured paper for errata slips, special notices, forms, etc., is often desirable.

There is a distinct aversion on the part of many operators to using the interleaving blotting device on the duplicator, and consequently the scope and style of the work have to be limited by using only an absorbent paper. Forms, etc., which have subsequently to be filled in with ink, can generally be done on the duplicator if they are run off on a writing paper.

BRUSHES.

For painting the drum on Roneo, Ellams, etc., a flat 3 in. enamel brush is required, and one such brush should be in the outfit of each machine.

For the developing fluid, a No. 8 artist's paint brush is best, for when it is necessary to develop the whole stencil much time is lost by using a small brush, and the wax is also liable to be scratched by the end of the holder.

For varnish, a small brush is required to enable the operator to do slight touchings up, and very large obliterations should be rare.

For cleaning the type of wax, etc., an ordinary typewriter cleaning brush is quite effective.

The size of the brushes **for use with signature ink** is not important; a No. 5 is the usual size supplied.

DEVELOPING FLUID.

The quality of the developing fluid is not of great importance, but various makes differ in solvent properties; and if the material supplied is found to be strong in its effects, it should, of course, be used very lightly and sparingly.

CHAPTER VII

BOOK AND PAMPHLET WORK

MORE can be accomplished on the duplicator in book and pamphlet work than most operators imagine. It is possible to produce, say, 200 copies of a 60-page book at a cost of one-eight to one-quarter of what a printer would charge, and, if the whole thing is carefully planned, the result would approximate in quality to the work of the printer. Take, for example, a foolscap 8-page pamphlet. For binding purposes, this is best done on brief-size paper. Take two sheets of brief paper together and fold over to foolscap size. With three stitches down the middle, it is in the form of a pamphlet. Now number the pages, and separate the two sheets. If the eight waxes are then run off on the pages as numbered, and the two sheets stitched up, an 8-page pamphlet in exactly the same form as a printer would produce it is given, and not as most operators would turn it out—eight sheets with a paper fastener in the corner!!! When a job runs into 60–100 pages, the use of double paper is not recommended, for the job would then have to be run off into sections of double paper and bound like a book. For bookwork, single sheets of paper printed on both sides are more convenient if the job is large. Before starting a book job, the operator should make out a little key as follows—

1. The typing of every wax to commence at 10 on the down scale and extend to 75.

2. Odd number pages to start at 10 on the cross scale and go to the black line.

3. Even number pages to start at 0 on the cross scale and extend to 65.

It will be seen that this key is necessary not only to secure uniformity in the pages, but to allow a margin on the left for binding. Each page should be numbered as it is typed.

Instructions must then be given to the runner-off.

1. The top line of every page to be 1 in. from top.

2. The left side of the typing to be 1 in. from the edge of the paper on odd number pages, and [illegible] in. on even number pages.

These arrangements will obviate the two open pages of the book appearing odd or being of different sizes: the type matter on a page of a book, when printed, is always exactly the same size; so it should be with duplicated books.

The stencils are then run off on both sides of the paper, and, of course, the copies should be interleaved to prevent off-set.

Much attention should be given to the cover and title page. The typist should display the title, etc., in the largest type available, and one or two ruled lines have much effect in setting off the work.

Generally speaking, the same wax will do for the title page as for the cover. For the covers, paper of the most suitable quality and colour should be used—large enough to go round the page. Thus a cover for a 60-page foolscap (13 × 8) job should be 13 × 16½. The sheets must then be spread out, carefully collated, placed into the cover, and stitched with three or four stitches down the left side with a wire stitcher, as shown on pp. 41–2.

If the job consists of twenty or more sheets, a double fold must be made at the back of the cover to allow for the thickness of the book—thus giving a flat back. The work can be further improved if the edges are trimmed in the guillotine (*see* p. 40) and a strip of leather or cloth is glued down the back.

PRINTING ON BOTH SIDES OF PAPER.

For economy in paper, for convenience in handling, and for bookwork, it is necessary to print on both sides of the paper. Unless an extremely absorbent paper is used, both sides of the sheet have to be interleaved to prevent the off-set which would spoil the work. Many operators object to printing on both sides of the paper because of the extra

The National Catering Co., Ltd.
LONDON

CANNON STREET,

31*st March*, 1917.

Telephone: 3333 Central.
Telegrams: Cater, Cent., London.

Dear Sir,

The business of this Company is now established on a firm basis, and this, I have no hesitation in saying, has been achieved by the untiring efforts of its various agents throughout the country. It is no easy matter to build up, from the veriest beginnings, a concern such as ours, to place it in the secure position which it occupies to-day, and to make it practically a household word in the homes of the people of England. Yet such has been effected within the short space of fifteen years, for as you are well aware, it is only fifteen years ago that the Company commenced trading, occupying, in the first instance, a small shop in White Street, Moorfields. Matters have undoubtedly changed since those days, and the servants of the Company, from the highest to the lowest, are to be congratulated upon the success which has been attained.

It is, however, well to remember that in business there can be no standing still. An individual company or firm must either go forward or fall behind in the race, and it has accordingly ever been the policy of the Company to introduce new features into the business as time and circumstances seemed propitious. Thus, five years ago, the system of post orders was largely extended, and the Company undertook to pay carriage on all orders of 10s. and over to any part of the British Isles. I have again been devoting serious consideration to certain projects which have been simmering in my mind for some time past, and, though I have to a great extent made up my mind in relation thereto, I desire to consult the persons who, if the problems become crystallised into tangible schemes, will have the carrying out of them, before any definite steps are taken. I shall, therefore, be glad if you will so arrange your business engagements during next week as to allow of your coming up to town on Wednesday, the 11th instant. On that day I propose to meet, at the Cannon Street Hotel, as many of the Company's representatives as can possibly get to London, and to discuss with them several matters bearing on the future policy of the Company. In particular I shall submit to them the following questions: (a) Do you think it desirable for the Company to establish, in the large towns of the British Isles, refreshment rooms and the necessary adjuncts thereto? (b) Is it practicable for the Company to undertake the functions of a caterer on a large scale? (c) What do you suggest in the way of extending the trade of the Company?

The question propounded under (b) is in reality germane to the matter dealt with under (a) although its scope must necessarily be wider. In regard to (c) I am open to receive any practicable suggestion from the Company's agents, and I hope that in the multitude of counsellors there will be wisdom, which, when applied to the concerns of the Company, will result in an appreciable increase in business, with corresponding benefit all round.

I am,

Dear Sir,

Yours faithfully,

Douglas Gray

labour involved in running into blotting books and the emptying of them. Against this, however, must be set the time taken in collating the sheets and stitching together; and the saving of paper alone would compensate for the extra labour.

A 2-page foolscap circular can be printed with one stencil if a brief or policy duplicator is in the office. This is done by typing both pages of the circular on the wax, side by side. (See pp. 32 and 33.)

If a thousand copies of this circular were required, 500 would be run off as above. Then the copies would be turned over and another 500 from the same stencil run off on the back, page 2, of course, coming on the back of page 1 in the second operation. If the paper is headed, it will be necessary to have the heading both sides.

If the sheets are then cut down the middle, a foolscap circular printed on both sides has been produced with only one running of 1,000 copies. The saving here is the running of 1,000 copies, and the emptying of them from blotting books; in other words, the labour is halved.

With a foolscap machine, a 2-page circular on paper 8 × 6½ could be similarly managed; while a 2-page note size (*i.e.*, 8 × 5) would be run off on quarto paper 10 × 8, the wax being typed longways.

Octavo-letter size can conveniently be done on a foolscap machine by typing the circular twice (or two different circulars) on the wax and running off on paper 9 × 7½, *which allows the wax to be typed the ordinary way up* and gives a circular on paper 7½ × 4½. If only a small number of one circular of this size is required, it may be typed on the right side of the wax, half the number run off on the right-hand side of the paper, and then turned and run off on the other half—which obviates typing twice.

PRINTING SEVERAL COPIES AT ONCE.

When printing small sheets of paper or cards, a real economy can be effected by printing two or more copies at once on a larger sheet. Thus, if an octavo or note size job is to be produced, it should be typed twice (longways of the wax) and run off on quarto, which, when cut into two, gives octavo. Similarly, if small slips are required, the copy is typed eight or more times on the wax and cut up afterwards. In this class of work a test copy should be folded before running off to ensure that the blade can cut at the proper place, and the machine, when set, must be kept at the same registration.

PRINTING IN VARIOUS COLOURS.

Signatures, headings, and special words can be printed in a different colour simultaneously with the rest of the copy. This is done by placing a small pad saturated with the colour ink underneath the part to be "picked out." Place the wax on the table so that it can be read, and lay the pad of Japanese paper over the part required and apply the coloured ink till the pad is saturated. This pad usually consists of four pieces of Japanese paper stuck together at one end. The pads are generally supplied much larger than required, and should be cut just a little larger than the signature or required piece. Then cover it with a protector—a thin piece of oil-paper, which must be larger than the pad—and place the stencil on the machine in the usual way. Care must be taken to prevent the pad from covering any of the surrounding typewriting; and for words and headings it will have to be cut to size, which should be as large as the surrounding typing will permit. The pad is re-inked by raising the stencil at the top or bottom and re-painting the pad, which, of course, should rest on the drum when the stencil is raised. Better results can be obtained, and a great economy can be effected by using two thicknesses of ordinary linen or nainsook for the pad and a piece of spoilt wax for the protector. A yard of nainsook cut into pieces 4½ × 2 and then doubled over would give about 160 such pads, which have the advantage over the paper ones of being used dozens of times, and incidentally of saving ink.

If a short circular is required in red or any other colour, it can be produced by affixing a large pad as above. A few bottles of the coloured inks would enable an office with only one machine to print their work in any desired colour.

OVERPRINTING.

Any sections of a diagram required to be in a different colour which overlap, should be drawn separately and overprinted. Of course, if a piece of a map or diagram is required in a different colour, and is detached from the rest of the diagram, a pad can be used as above. If two or more printings are required, great care must be exercised to secure perfect registration each time; and it is for this reason that the flat duplicator is best suited for all work where a subsequent overprinting is required, for obviously a diagram can always be placed exactly in the same position on a sheet of paper, whereas with a rotary machine such exact registration is impossible. (*See* also p. 23.) Particular attention must be paid to the running off of diagram or map work, for a spot which develops unnoticed may spoil the work entirely.

Overprinting is also very useful for inserting an omitted date, or any other part of the copy omitted in error, for which there is space to insert.

CHAPTER VIII

SKELETON LETTER WORK

In most firms and Government Departments, the same form of letter is used for different work, with slight modifications as to names, goods, etc. It is the practice in some cases to have a letter printed, and the blanks are filled up. The letter then loses its personal character, and often does not receive the attention which a specially-typed letter would obtain. If the skeleton letter is carefully duplicated and the blanks afterwards matched in on the typewriter, it should have the appearance of a specially typewritten letter. This is particularly useful in cases where the personal nature of the letter must be retained, yet where it is, for the most part, a stock letter. The typist must exercise discretion as to the relative distances of the blanks, and arrange them to come at the end of the line if possible. (An example is given on page 38.)

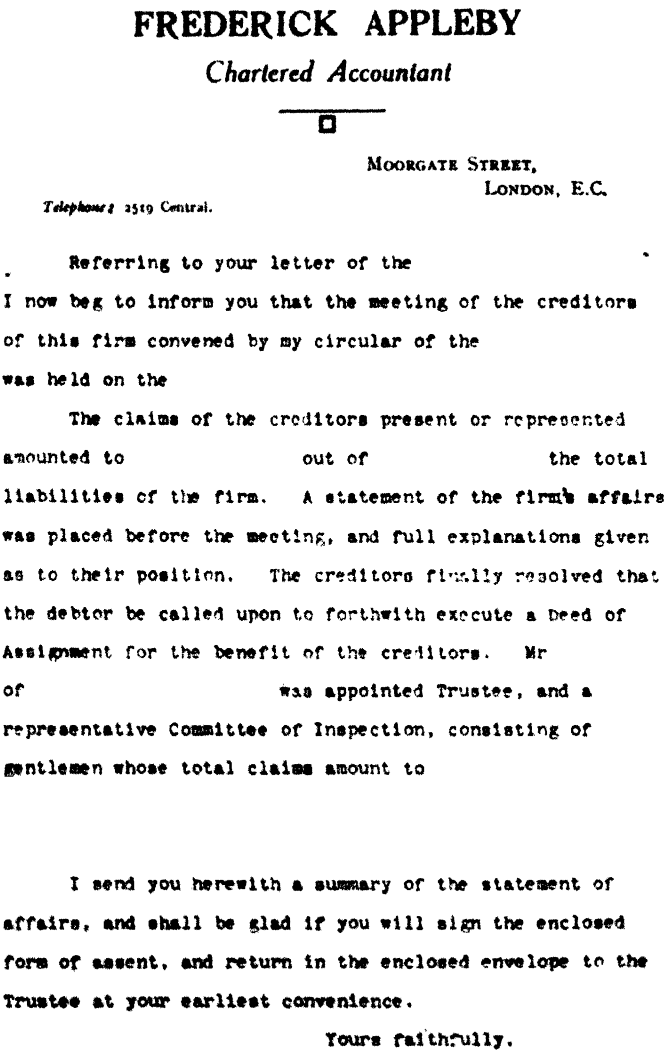
Skeleton letters are also of great use to hotels and boarding-houses in replying to applications for accommodation. If there is no typewriter in the office, or if it is desired to give an autograph reply, the skeleton can be written on wax (preferably on the typewriter wax, for it gives a better imitation of handwriting, *see* p. 61), and afterwards the blanks can be filled in by the person who wrote the skeleton.

UTILISATION OF WASTE PAPER.

In every office where duplicating is done, there is always a certain number of waste copies which are usually thrown into the waste-paper basket. By the side of every machine a tray should be placed for this paper, and the operator should use it for test copies. Experience, however, proves

SPECIMEN OF SKELETON LETTER

(See page 37)



FREDERICK APPLEBY

Chartered Accountant

MOORGATE STREET,
LONDON, E.C.

Telephone: 2519 Central.

Referring to your letter of the
I now beg to inform you that the meeting of the creditors of this firm convened by my circular of the
was held on the

The claims of the creditors present or represented amounted to   out of   the total liabilities of the firm. A statement of the firm's affairs was placed before the meeting, and full explanations given as to their position. The creditors finally resolved that the debtor be called upon to forthwith execute a Deed of Assignment for the benefit of the creditors. Mr
of   was appointed Trustee, and a representative Committee of Inspection, consisting of gentlemen whose total claims amount to

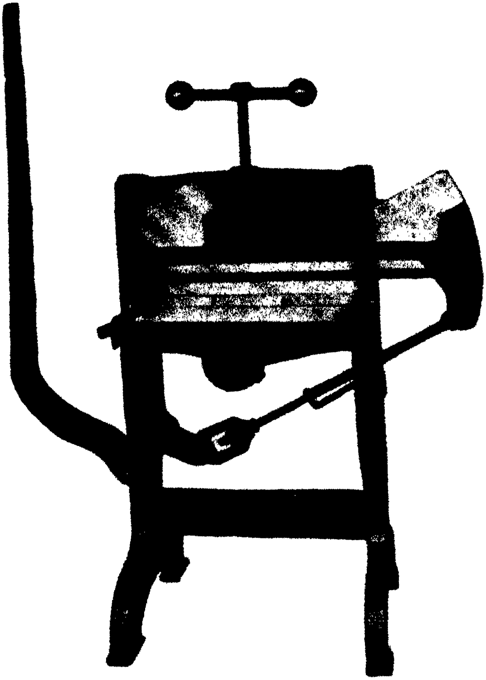
I send you herewith a summary of the statement of affairs, and shall be glad if you will sign the enclosed form of assent, and return in the enclosed envelope to the Trustee at your earliest convenience.

Yours faithfully.

that the amount of waste is greater than the needs of the operator for test copies, and it is this extra waste which should be utilised. It should, first of all, be sorted into glazed and absorbent, with the blank sides all one way up. The paper must then be prepared for use as slips. If names or departments are required on these slips, they should be duplicated and then cut up.

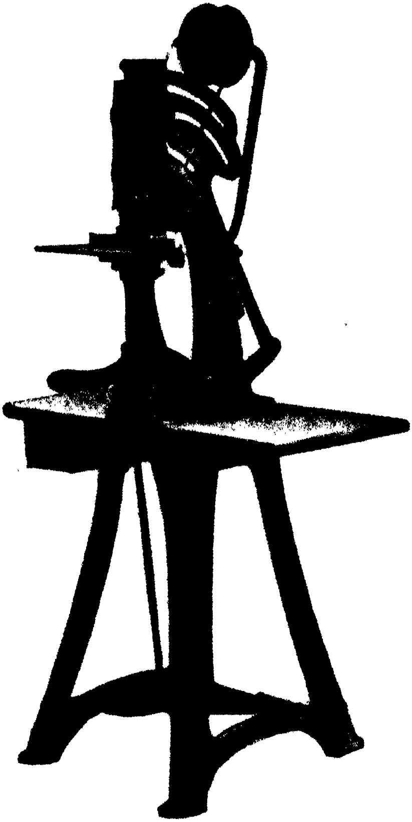
Foolscap paper can be straightened up, placed in the copying press, and the long edge glued, a piece of tissue paper or linen being placed over the glue. This glued block when dry, can be cut into four; and the glued edge subdivided into the required thickness for memo. blocks. Other sizes for drafting, etc., can be made in like manner.

THE GUILLOTINE



The above is a photograph of a small guillotine suitable for work in connection with a Duplicating Department. It is fitted with a 14 in. blade, and will do all the cutting necessary for work in connection with duplicators.

THE WIRE STITCHER



British Wire-stitching Machine Co.

This machine is specially convenient for stitching large quantities of duplicating work, and also for use in connection with book and pamphlet work (p. 30). It makes its own staples from a reel of wire, and stitches up to $\frac{3}{16}$ in. in thickness, and wire from Nos. 24 to 30 gauge can be used. A similar machine, stitching greater thicknesses, can also be obtained.

This is a smaller type of a machine which uses ready-made staples, and the stitch is identical with the machine shown on page 41.

SECTION II

ROTARY DUPLICATORS

CHAPTER IX

ROTARY DUPLICATORS GENERALLY

No criticisms as to the merits or demerits of the various duplicators herein described, or as to other makes, will be offered. Neither is it suggested that other makes not mentioned are worthless. The machines described are the most popular on the market, and the notes given are intended to supplement the instructions given by the maker.

GENERAL NOTES REGARDING ROTARY DUPLICATORS.

The most important point in the use of a rotary duplicator is that it shall be perfectly clean. Good work cannot be obtained from a machine that is smeared and dripping with ink.

CLEANING.

Wipe superfluous ink from all parts. On most machines the ink which gives most trouble comes from the remote or almost inaccessible parts of the machine. See that the roller is clean, and not coated with a dried mixture of paper fluff and ink. If the roller is so coated, its truth will not be correct, the copies will be unevenly inked and the paper will not bite so well between the roller and drum. To clean, remove and scrape with a blunt knife, and, if necessary, wash with cold water and soap, oil the bearings, and re-insert the roller. In the Roneo machine, the roller must be inserted in the right gearing, otherwise the paper will not pick up correctly, or the machine may "jam." Periodically, according to the use of the machine, it should be "bathed." This is best accomplished by taking it to a sink and turning on hot—but not boiling—water, and rubbing the ink and grease off with a soapy rag. This may seem contrary to the general treatment for machinery, but for this type of machine it is really effective. The duplicator must then be thoroughly dried, and all the bearings well oiled. Then affix a new linen pad, and the machine should run as well as when new. This paragraph does not apply to the Gestetner machine.

LINEN PADS.

The linen pads which cover the ink-drum should be renewed frequently. They very soon become coated with wax, fluff, and varnish which inevitably come off the waxes, and the pores of the linen become clogged so that no ink is able to percolate through from the ink pad or reservoir underneath. The silk carrier of the Gestetner does not require renewing very often, for it does not appear to hold the wax, etc., as do the linen pads of Roneo, Ellams, Revol, and similar makes. When fitting a new linen, always clean the perforated zinc drum, for if any of the perforations are clogged it will prevent even inking.

INKING.

The inking arrangement is the most vital part of all duplicators. The ink must appear only on the drum and the inking arrangement, not all over the machine. Ink which rests on any other part of the machine collects dust and fluff, and clogs the machine. Many operators waste quite a large quantity of ink, and duplicator ink is very expensive. As far as possible, every drop of ink which comes out of the tube or can should be used. Much ink is often wasted by placing a protector or a sheet of paper over the drum every time the machine is put up. Unless the duplicator is not going to be used for several weeks, this is totally unnecessary and is wasteful of much ink; this does not, of course, apply to the American cloth drum covers. A better idea is to switch off the pressure and insert a piece of paper between the roller and the drum. This paper will then catch any drops of ink which may come from the drum, and, if the machine is not unduly inked, only one or two drops may be wasted. The drum must always be left with the centre downwards, otherwise the ink collects on the ends and gives much trouble.

GENERAL.

Do not leave the stencil on the machine when it is put away, otherwise parts of the wax may adhere to the drum.

When removing a wax from the drum, see that none of the varnish which may have been used on the front of the wax has adhered to the drum. If it has adhered, scrape it off.

MACHINE PICKING UP TWO OR MORE SHEETS AT A TIME.

This is caused by—

(*a*) The edge of the paper being uneven;

(*b*) The paper not being straightened up before inserting into the machine;

(*c*) The adjustment of the rubber pick-ups not being correct;

(*d*) Resting the hand on the feed-plate when working machine.

MACHINE NOT PICKING UP LAST FEW SHEETS.

Many machines will not pick up the last few sheets. Generally there is nothing wrong with the adjustment, and it may misfire, or the last four or five sheets may feed through at once.

PAPER CREASING.

If the paper creases, smear a little French chalk on two or three sheets of paper and feed through the machine. On the Roneo, the creasing of the paper is generally occasioned by imperfect adjustment of the rubber pick-ups. Taking out the paper and straightening will often rectify this trouble.

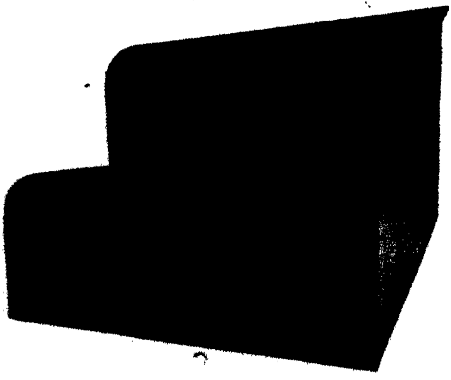
PAPER STICKING TO THE DRUM.

If the paper sticks to the drum, bend the paper over about 2 in. from top edge before inserting in the machine; or stick two or three thicknesses of paper at the head of the wax just above the top line of typing; or see if the paper "strippers" are properly adjusted; or run a sheet of blotting paper through five or six times. A very thin glazed paper will also stick to the drum. If other methods fail, feeding in two sheets at a time will prevent the trouble which is generally occasioned by the light weight of the paper being insufficient to enable it to leave the drum.

(*See* also Special Notes under the different duplicators.)

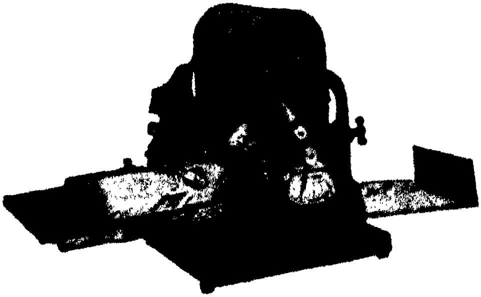
COLLECTING TRAY.

Duplicating machines are not generally fitted with an adequate or suitable collecting tray for the copies; and, if large numbers are being run off, much time is necessary to straighten up the paper. A collecting tray as shown below can be made in tin or cardboard.



CHAPTER X

THE GESTETNER ROTARY CYCLOSTYLE



MR. D. GESTETNER is the pioneer of the stencil principle of duplicating, and all the present-day machines undoubtedly owe much to his ingenuity and pursuit in perfecting stencil methods. The Cyclostyle, which was the name given to the original patent comprising the Cyclostyle pen and stencil paper was brought out in 1881. The first stencil paper for use in a typewriter was patented in 1888, and the Rotary Cyclostyle (as illustrated above) was introduced in 1902.

It will be observed that the Gestetner Rotary Cyclostyle is quite different from any other type of rotary duplicator. The strongest feature of this machine is the ingenious inking arrangement, by which a non-fluid ink is automatically distributed on the machine by a form of printers' distributing rollers. The dripping of ink is impossible, and, if the machine is in working order, the distribution is uniform throughout the work. When copies grow faint for lack of ink, a line of ink from the tube is squeezed across the top cylinder and the work proceeded with. The use of an oil ink on this machine is one of its main recommendations, for oil inks do not dry on the duplicator, and the Gestetner can be put aside for months and used again without any trouble with the inking device. The standard model requires three turns for each copy. In practice, this is found to impose the least strain upon the stencil, and, consequently, no cracking appears. When speed is the first consideration, "one-turn" models are furnished.

The mechanism of the Gestetner presents a more complicated appearance than other rotary duplicators, but in actual use it is very simple—two levers governing the entire action.

SPECIAL INSTRUCTIONS FOR GESTETNER.

Do not spoil the headpiece of the stencil when typing, for owing to the large number of slots it soon becomes damaged, and is then difficult to affix on to the machine: once the slots are torn it is not easy to repair them.

Carefully check the stencil before fixing on the machine, for "grafts" (*see* p. 14) cannot be carried out as easily as on a Roneo or Ellams, as the silk carrier would probably be cut—a cut in the silk carrier being of more moment than on the linen.

If "picking out" pieces in different colours (*see* p. 35), it is advisable to fix the pad on one edge to the wax, for these pads have a tendency to slip on this machine.

If one "liner" of the impression roller gets worn out, remove the corresponding one on the other side and use without any until new ones are fitted. If the machine is used with one liner, the impression may be unequal.

Before taking test copies, turn the handle a few times in order to bring the ink through. Leave the backing sheet on and turn the handle two or three times with pressure lever on, or print one or two copies on blotting paper.

The sliding guides should be pulled out so that the copies leave the machine in a concave form, which prevents one copy from smearing the preceding copy.

Watch the paper-feed carefully, for if the impression is taken on to the roller and it is not wiped, at least six copies will have a double impression.

Remove the stencil from the carrier after each job.

Grit and dirt accumulate on the inking cylinders, especially if the machine is left uncovered. Remove the silk carrier and dry the rollers by passing waste paper through the machine until all the ink is removed. Take out ink distributing rollers and clean with petrol or benzine.

Good results cannot be obtained if the machine is worked very quickly.

The last five or six sheets on the feed board are liable to feed in at once. Refill the machine.

Clean the silk carrier occasionally with petrol, and carefully remove particles of grit and wax which produce spots.

If the paper fingers slip, and the screw is turned down, they must be cleaned with petrol; or, if very worn, they should be turned, and another edge brought into use.

(*See* also pp. 19 and 43.)

CHAPTER XI

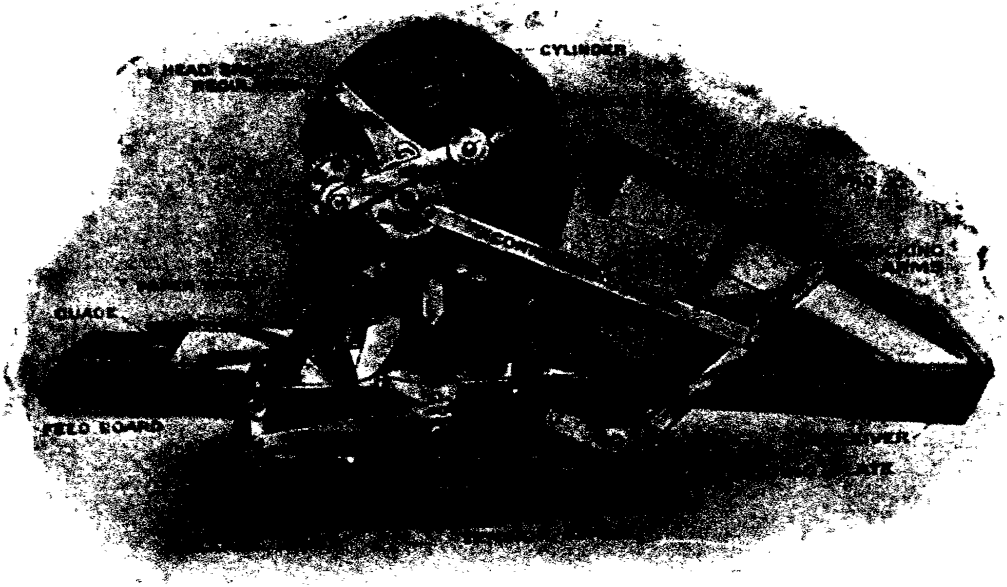
THE RONEO DUPLICATOR

The Roneo marked a new era in duplicating, and from its inception has been a recognised success. Although quite different in form from the flat duplicator, it belongs to the stencil type of machine. The operation of a Roneo consists in stretching the wax stencil over an ink drum, and, by passing the paper between this drum and an impression roller, the copies are produced. If properly worked, the Roneo should not require any repairing; but, of course, slight adjustments have to be made which can be done by the operator, providing he has an idea of the construction of the machine.

SPECIAL NOTES FOR RONEO

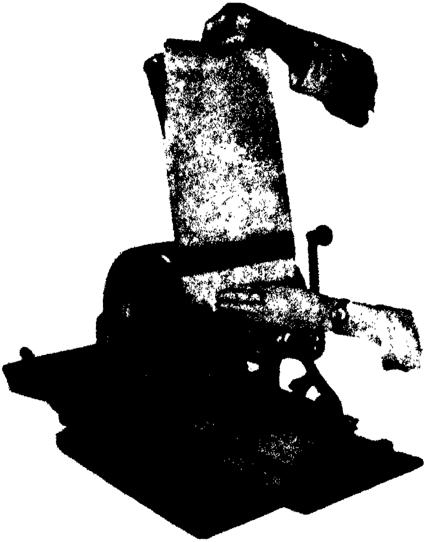
CLEANING.

Wipe ink from all parts of the machine except the drum. It is important to clean the ends of the drum (on top and underneath), the sides of drum, the hooks which hold the paper at top, underneath the shield which partly covers the felt ink-distributing roller, the projecting paper delivery plate, and the rubbers on the pick-up rod.


CYLINDER
GUAGE
FEED BOARD

FIXING STENCIL TO THE MACHINE.

Before applying the stencil, always re-ink the pad by painting with a brush. This is always necessary, even when taking off one stencil to put on another. Remove front tissue; lay the stencil on the feed-board as if to read; then with the right hand lift the stencil by the bottom, and with the left hand fasten it on the machine by slipping it under the plate so as to allow slots in the headpiece to fit on to the pins at the front end of the cylinder. Let the stencil gradually fall on to the inked pad; then remove the backing sheet by tearing off a ½ in. from the first line of typing. It is advisable to lift the stencil again, stretching slightly as it touches the pad so as to avoid fullness, which will cause wrinkles.



INKING.

Two or three revolutions of the machine, with the ink reservoir switched on, is usually sufficient for re-inking. One very slow backward movement of the machine and then two forward will best distribute the ink. Occasionally the spindle of the rubber ink reservoir roller jumps out of the slot: this must be inserted into its right place, otherwise the machine would be inked only on one side.

THE AUTOMATIC PAPER-FEED.

The paper thickness indicator at the right-hand side of the machine must be adjusted for different papers; but this indicator is also affected by the rubber pick-ups, for if they are allowed to wear smooth in one place, the "paper thickness pressure" will have to be increased to make them bite the paper. Turn the rubber pick-ups occasionally to ensure them wearing even. New rubbers should be fitted to the machine when the corrugations in the rubber are worn off.

If two or more sheets are picked up at a time, less tension is required; and if the machine repeatedly fails to pick up, more tension is necessary. Taking out the paper, flapping over the edges and carefully re-inserting, will often cure troubles with the feeding device.

Do not rest the hand on the feed-board whilst running off. If using a thick paper, place the paper weight on the set of pins furthest away from the impression roller.

CHANGING THE MACHINE FROM AUTOMATIC FEEDING TO HAND-FEEDING.

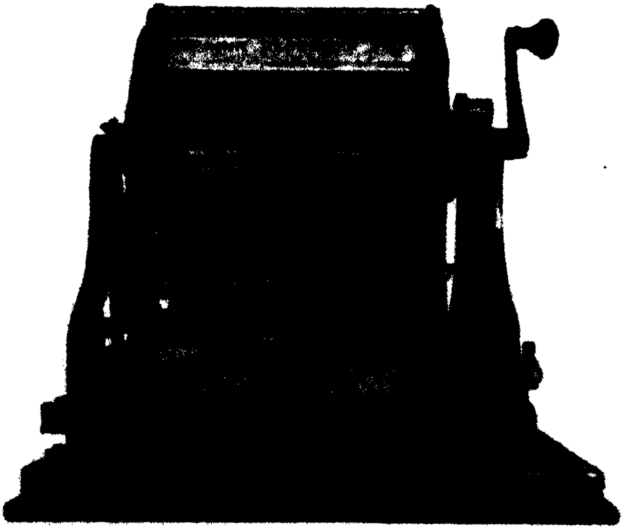
Remove the feed-plate and, if required, change the gauge from the centre slot to the right-hand side of the plate. Pull out the catch from the slot in the top left-hand gear wheel. Unturn the screw which holds the moving head-paper stop out of action on to the mainshaft of the machine, and the head guide will drop down to the impression roller.

Insert the paper-feed plate over the two studs which project from the sides of the machine, and under the further stud on the right.

TO REMOVE IMPRESSION ROLLER.

Press the left thumb on the left-hand side of the impression roller carrier (near spring). Push over the cap which keeps the spindle in position on the right side, and lift out the left side of the roller, bringing it towards you. When re-inserting the roller, care must be taken to set it in the right cogging, the rubber pick-ups being about a ¼ in. below the bottom end of the drum, when it is turned back.

This roller, when coated with a dried mixture of ink and fluff, must be removed from time to time to be scraped and cleaned.



IMPRESSION ROLLER WORKING STIFF.

One of the chief troubles on the Roneo is the impression roller working stiff, but the Roneo Co. is contemplating an improved form which will obviate this. When this roller works stiff there is an undue strain on the wax, which soon causes it to become useless, and if very stiff the wax will be torn. The stiffness is caused through dirt. The roller should be tried occasionally, and, if stiff, it must be removed and oiled. If this fails to ease it, undo the screws and remove the roller and spindle from the gear wheel, and clean the bearings.

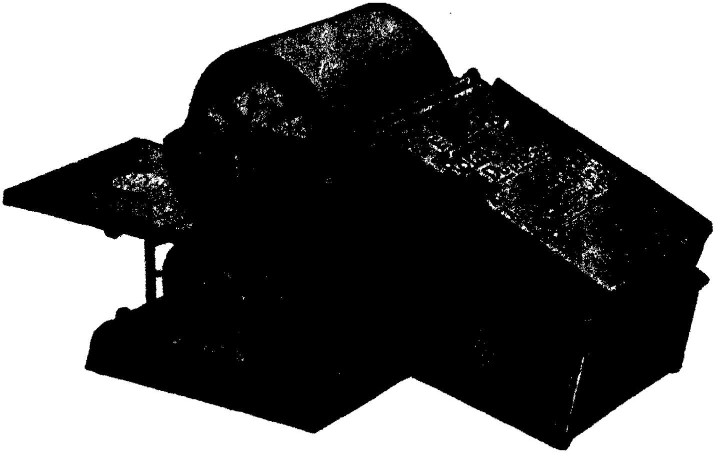
INTERLEAVING BLOTTING BOOKS.

The pages of these books must be knocked on the end of a tray, so as to be absolutely level. After much wear, the defective pages, together with the preceding or following page, must be removed. When very old, a number of books can be broken up, the good pages picked out and collated to form new books. (*See* also p. 22.)

(*See* also pp. 19 and 43.)

CHAPTER XII

THE ELLAMS' ROTARY DUPLICATOR



ALTHOUGH apparently very similar to the Roneo, Ellams' machine differs in several important points. The automatic feed works on the principle of pushing each sheet along to the impression roller. This is done by means of a feeding roller with two rubber gripping bands, which free-wheels or runs over the paper in the backward movement (*i.e.*, while the previous copy is being drawn through by the drum and the impression roller).

The paper must be placed on the feed bed of the duplicator between the two side paper grippers, and up to the automatic paper stops. This ensures the placing of the paper always in the identical position for satisfactory feeding. The side paper grippers should be drawn in tightly. The paper should then be slightly "cradled" by running the thumb over the edges. It is impossible to put too much paper into the machine, as the ratchet feed roller must rest in its brackets over the paper, and if an over-supply of paper is placed in the machine it will easily be found that there is no drop into the brackets for the feed roller. This is remedied immediately by removing a portion of the paper.

Perfect registration cannot be guaranteed with Ellams' machine any more than it can with others; but if more exact registration is required, the hand-feeding device can be used and the work can be produced with every satisfaction. For general work, however, absolutely perfect registration is not required, and this point does not apply.

INKING.

The ink distributing roller is switched into operation by a small lever on the left of the machine, and the cylinder is turned in a backward and forward direction a few times to replenish the ink supply.

SPECIAL HINTS FOR ELLAMS.

See that the ink is evenly spread over the surface of the drum by painting with a brush; and, on the inside, by switching on the ink-distributing roller and filling up the holes in the perforated zinc. Stretch the wax very carefully, and tear off the backing sheet after the stencil has been placed on the drum. It is advisable not to tear off the backing sheet at the perforation, but about ½ in. above the top line of the typing. Before inserting the paper, remove the automatic feeding roller and insert the paper in paper-feed very carefully. It should be inserted only when the feed-roller is in such a position that it can be taken out. Do not use the pressure lever higher than the fourth notch, unless it is necessary to increase the density of the copies. If a large number of copies are required, it is advisable to run the machine only on the third notch, in order to protect the stencil from an undue pressure. When the copies become faint and the ink will not percolate through by using the ink-distributing roller, it is necessary to lift the wax and re-ink the linen.

Do not race the machine. Avoid jerkiness.

If a wax has been typed too high and the printing indicator cannot be brought any further down, a few thicknesses of paper stuck on the headpiece of the wax will cause the paper to bite sooner, and thus the print will be lower down on the paper. This is a particularly useful hint for the Ellams' and Revol duplicators. The wax can also be lengthened or shortened, as described on page 19.

If accidentally the drum of the duplicator is revolved and no paper passed through, the off-set printed on to the bottom pressure roller can easily be removed by taking the pressure roller out of the machine and rolling it several times over a piece of waste paper, or carefully rubbing it with a duster. If this pressure roller becomes sticky at any time, a little powdered French chalk rubbed over it and applied by the hand will set the matter right.

(*See* also pp. 19 and 43.)

SECTION III

FLAT DUPLICATORS

CHAPTER XIII

STENCIL METHODS

THE flat duplicator has been more extensively used than any other form of stencil apparatus, and there are probably more of these machines in use at the present day than the rotary. But everywhere the flat is giving place to the rotary like the stage-coach gave place to the steam-engine. Nevertheless, excellent work can be done with a flat duplicator, and slowness is its principal drawback. Moreover, there are many offices and departments which have not sufficient work to justify the expense of a large machine.

For certain classes of work where each copy must be in perfect registration, the flat duplicator must be used, for the rotary will not give absolute exact registration For duplicating over 100 copies in various colours, an Ellams' Multicolour outfit should be obtained: the process consists in drawing each coloured part on a separate wax and running off in the colour of that part. Multicolour duplicating for under 100 copies can best be done by a gelatine, a Plex, or a Grapholithic.

In principle, the flat duplicator is exactly similar to the rotary, and nearly all the foregoing hints, etc., will apply to its use. The *modus operandi* is tolerably simple, but the production of first-class work depends upon experience.

WAXES FOR FLAT DUPLICATORS.

(*a*) **For Typewriting.** The waxes for flat duplicators are not always supplied made up in sets, so the typist must arrange them in the following order—

(1) Tissue protecting sheet;
(2) Wax;
(3) Silk sheet; and
(4) Backing sheet.

Silk sheets are generally used for flat duplicator work, but their use depends upon the face of type and the impression desired in the copies. Some backing sheets do not have any scales, in which case it is necessary to determine beforehand the positions on the wax on which the typing must fall. The notes given for typing rotary waxes then apply, and mistakes should be corrected as shown in Chapter IV.

(*b*) **Autographic Stencil Paper for Handwriting.** The stencil paper for handwriting is different from that used for typewriting, although the latter can be used for handwriting (*see* p. 61). There are generally two different grades of autographic stencil paper: one for use with a stylus and a file writing plate, and the other for use with a wheel pen and writing plate. On the hand stencil paper, black or blue squares are generally printed as guide lines; but any form or skeleton table for any particular purpose can be printed on the skin by the makers. (*See* also pp. 6 and 11.)

HANDWRITING OR AUTOGRAPHIC STENCIL WORK.

Take a special autographic stencil or skin and insert tightly and firmly in the frame, seeing that it does not sag anywhere.

The stencil is produced by placing the skin in the frame over a steel plate upon which are a large number of fine corrugations, which give the appearance of a file, and it is upon the small sharp points of this steel plate that the stencil is cut with a stylus. Where the stylus is passed over the stencil, the sharp points of the plate make a series of small holes along the line which the stylus is traced, and it is subsequently through these holes that the ink percolates.

By the Gestetner or Cyclostyle method, these small holes are pierced by using a cyclostyle pen (which has a little wheel at the end with sharp teeth or corrugations) over a hard surface: both methods produce the same result (*i.e.*, the perforation of a large number of little holes). If a copy drawing has to be made, it is advisable to place the copy underneath the stencil and trace lightly on the stencil. The copy is then removed, and the stencil cut on the plate. It would, of course, not be practicable to trace the drawing over the file plate, for the cutting of the little holes could not be done through the copy. With the cyclostyle, however, the wheel can be used direct over the copy, but it is better to insert a transparent celluloid writing plate under the wax.

Place the stencil over the file plate or writing plate, and write with the stylus or wheel pen with a firm and even stroke. A burring sound is caused when the stencil is being correctly cut. Rest the hand on a thin pad of blotting paper to prevent the heat of the hand spoiling the wax.

If it is desired to reproduce an exact imitation of handwriting (for skeleton work, etc., *see* p. 37), better results can be obtained by using a typewriter wax over a stylus writing plate. The result on the skins is always a series of little dots, which make up the outline of the letter; but a continuous line can be obtained on a typewriter wax; and, with a little practice and the right ink, a perfect imitation of ordinary pen work can be obtained.

A special stylus and plate can be supplied for music.

FLAT DUPLICATOR APPARATUS.

There are so many different forms of apparatus for flat duplicating, that a whole book would be taken to describe each. The Ellams, the Mimeograph, the Cyclostyle, are very similar in construction, and they are so similar in working that a knowledge of one would be applicable to all.

The general working is described in these diagrams of the Neo-Cyclostyle.

THE PROCESS is simply as follows—

A sheet of the prepared paper is fixed in the printing frame as shown in Fig. 1. The matter is then written on this sheet of paper with the Neo-Cyclostyle pen, which perforates the paper, making a perfect stencil composed of minute dots so close together as almost to appear a continuous line (*see* Fig. 2). The printing frame holding the stencil is next raised, a sheet of paper placed under the stencil, an inked roller is passed over (as Fig. 3), and a perfect copy obtained as shown in Fig. 4. Only give one stroke for each copy, as a double impression may be caused by passing the roller twice. It is then only necessary to lay in the sheets of paper and print the required number by passing the roller over for each copy.

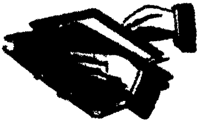


FIG. 1.

FIXING STENCIL IN FRAME.

FIG. 2.

WRITING ORIGINAL.

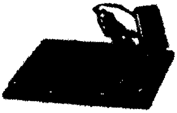


FIG. 3.

PRINTING OF COPIES.

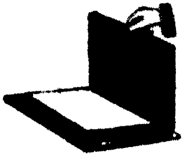
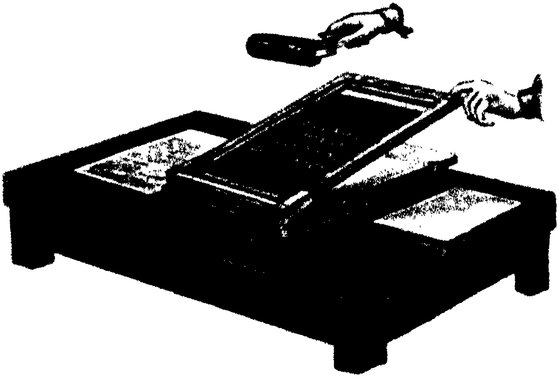


FIG. 4.
FINISHED

Ellams' self-rising duplicator is used similarly, but the stencil is cut by a stylus over a file-plate.



A more elaborate form is shown in the following of Gestetner's Automatic Cyclostyle, which is undoubtedly a great advance on the hand roller apparatus, and should be regarded a mid-way machine between an ordinary flat duplicator and a rotary.

CHAPTER XIV

COMPOSITION DUPLICATORS

THE CLAY AND GELATINE PROCESSES.

THE use of the Hektograph or gelatine process was practically the only method of duplicating before the introduction of the stencil process, and it is undoubtedly the simplest process known, and probably has been used the most extensively. Even at the present day, where the number of copies required is very small, and where the expense of the larger machines cannot be justified, this process is quite satisfactory. Indeed, for certain classes of work (*e.g.*, drawings, plans, and sketches, etc.) to be printed in a variety of colours, it possesses advantages over all other forms of duplicators, for copies can be obtained in several distinct colours at one operation. But the duplicating powers of this process are very limited, for only about 30 copies with typewriting and 60–100 with handwriting can be obtained. The makers advertise 50 with typewriting and 100 with handwriting, but these are exceptional figures. The number of copies depends upon the quality of the ink and the condition of the composition.

The composition process consists of typing or writing an original with a special strong ink on a sheet of glazed paper. This original is then placed face downwards on the composition on which it makes a negative, and the copies are obtained by laying blank sheets on this negative.

The composition varies with different makes, and the old graph or gelatine is giving way to the china clay composition. The most popular of the clay processes are undoubtedly the Plex and the Grapholithic. The notes below will apply to almost any composition duplicator.

FOR TYPEWRITING.

Clean the type; use a Hektograph ribbon or Hektograph carbon sheet; strike the keys firmly and evenly, and avoid errors.

FOR HANDWRITING.

Take a new pen—not too fine; use Hektograph, or special ink supplied with outfit; write evenly, and avoid making one word thicker than another. If the ink on the nib runs out and the word is finished with just a thin mark, it must be inked over, for otherwise there will be insufficient ink for duplication. Allow the original ten minutes to dry, and *on no account use blotting paper or heat to hasten drying*.

TAKING OFF THE COPIES.

See that the surface of the composition is clean and even. If a large number of copies are required, damp the composition with a wet sponge and remove the moisture with a sheet of fairly absorbent paper—not blotting paper. Lay the original face downwards and press the roller, squeegee or hand over the sheet lightly, and allow it to remain on the composition for about five minutes. Before taking it off, stick some strips of paper round the edge of the original, slightly overlapping each in order to form a gauge to place the sheets for copying. If only a few lines appear on a large sheet of paper, it is best to cover the whole of the composition except the negative; this enables the copies to be run off quicker, and saves the paper from curling so much. The negative is now ready for printing off. If a large number of copies are required, speed is essential, for the moment the original leaves the composition the ink begins to sink in. Do not use absorbent paper, but a paper with a smooth surface. Further copies can be obtained from the negative when it is exhausted by damping a sheet of paper slightly and placing it on the composition.

Immediately after the copies have been run off, the negative must be washed off. It is in this washing that compositions are generally spoilt, for as it is a job which is handed to the office boy, he usually manages to scrub it in boiling water and makes the surface uneven, to say nothing of the amount of the composition he washes away.

When the composition is worn away or is too uneven to use, a new refill of the clay is bought; while with the "jellies," a new tin of jelly is melted down by standing in boiling water and poured into the tray, or the old stuff can be scraped out and melted down. If any bubbles appear on the surface, they should be removed with the edge of a stiff piece of paper.

There is also another form of duplicator, generally of German make, which consists of placing the original on a sheet of paper upon which is a film of composition instead of on a tray of composition. This obviates the necessity of washing off, for the ink sinks in and the paper may be used two or three times. Otherwise, it is exactly the same as the graph process, and on account of its convenience is much used in Continental hotels for printing the *menus*, etc. An English make—the *Tablograph* machine made by Ellams to supersede the popular Schapirograph made by Schapiro of Berlin—consists of a roll of the prepared paper, which runs from end to end of a cabinet. The used surface is removed by turning a little wheel, and the new surface is brought into position. (*See* illustration on page 68.) A roll of the prepared paper can be used several times, for the ink of previous negatives becomes absorbed into the gelatine.

The Impactor Convex Duplicator, which has a convex surface and a composition which does not contain any glycerine or gelatine, claims to be superior to the ordinary flat composition, as its life is greatly prolonged for it does not wear away in the centre.

Another form of duplicator, if it can be so called, is the copying press. This method is sometimes used by authors who desire to have, say, six copies of their manuscript. The manuscript is written in a specially strong hecktograph or copying ink, and the copies produced in the ordinary way.

GRAPHOLITHIC

SECTION IV

TYPE-SETTING DUPLICATORS

CHAPTER XV

TYPE-SETTING DUPLICATORS

THE extent to which duplicating machines were used demanded that the chief drawback to the stencil process—namely, the limited number of copies obtainable from one wax—should be overcome. Also there was a demand that the copies should more nearly approximate to typewriting by being printed through a ribbon with metal typewriter type. With these objects in view, a type-setting machine has been introduced which enables an office to do most of its own printing without installing a printing press.

The principle of these machines is the setting up of metal type in a flexible cylinder from a "Gravity Fount" for the Roneo, and by means of an automatic setting device into a segmental drum from a compo-drum for the Gammeter. Once the type is set up, an unlimited number of copies can be obtained without deterioration of quality; and the great variety of types which can be supplied, and the use of electrotypes and stereotypes, meet all needs.

The Gammeter and the Roneotype undoubtedly do all that is claimed for them, and possess great advantages over the stencil process.

The setting-up process is slow compared with typing a wax, but it compares favourably with the printers' press, as little or no "making ready" or "underlaying" has to be done. Forms, headings, diagrams, etc., are produced by the use of electrotypes and stereotypes, which give a perfect reproduction.

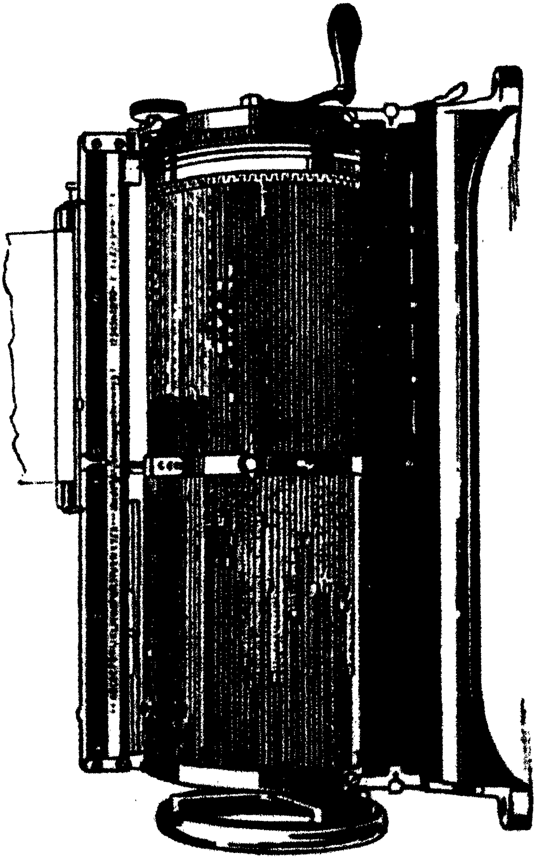
At present, the process is more expensive than the stencil process for small numbers of copies, and the initial capital expenditure is many times heavier; but the extra expense is justified where there is a considerable amount of work to be done and where the work is varied. There is also the distinct advantage over the stencil machines of being able to print on glazed paper without the use of interleaving blotting books. The segmental drums and the flexible forms cannot be retained to any large extent, as it would be necessary to have a large number of drums and large stocks of type.

Signatures are produced by inserting an electrotype and using the signature attachment. In a large office it would therefore be necessary to have electrotypes made for each signature.

The work in many offices, however, can justify the use of such a duplicator, and when the heavy initial outlay has been met, the upkeep is very small.

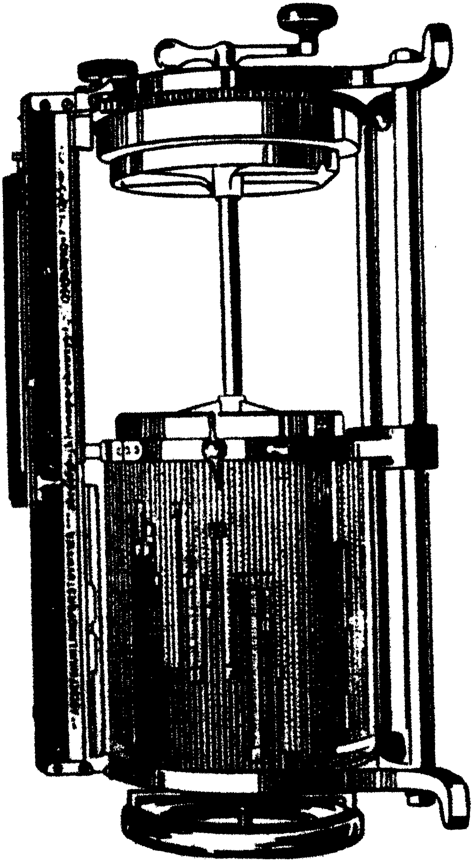
THE GAMMETER

The complete Gammeter Multigraph equipment is made on the principle of the expanding bookcase, thus enabling a firm to install the basic outfit and add to it as the business grows or the machine replaces the work of a printer.

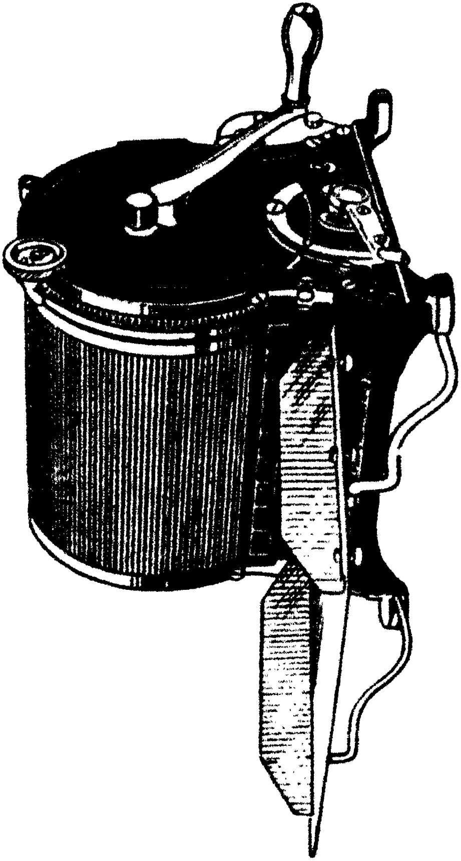


The above is a photo of the basic Gammeter No. 4—the compo-drum being on the left and the printer on the right.

There is a great disadvantage connected with the installation of this machine, for it is obvious that one-half of the equipment is always idle—thus preventing one drum being "taken down" while the next is printing. In a later model, the printing and setting units have been separated.

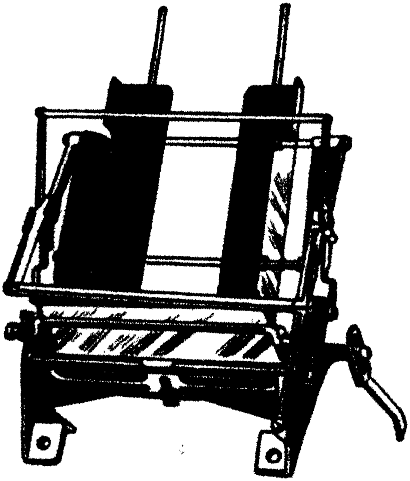


The above illustration represents the Multigraph Compotype, on which the composing and distributing of the type is done. The type indicator is controlled by a wheel at the left of the machine, and by means of the operating key worked with the right hand, the type is transferred into the groove of the printing drum. The type is re-distributed by reversing the process. Any number of segmental drums can be supplied for use with this machine, enabling type to be retained set up if necessary.

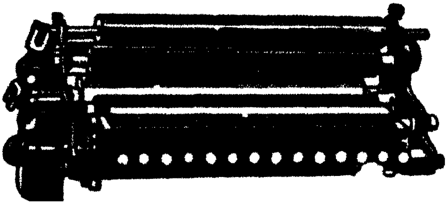


The above illustration shows the basic printing machine for use in conjunction with the Compotype. The segmental drum, when set up, is transferred from the Compotype to this machine, and the letter or form is printed through a ribbon giving actual typewriter copies.

Several further attachments can be fitted as required.

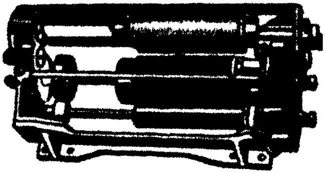


THE AUTOMATIC PAPER FEED will feed accurately in *perfect registration* any substance from a thin bank paper to medium card.



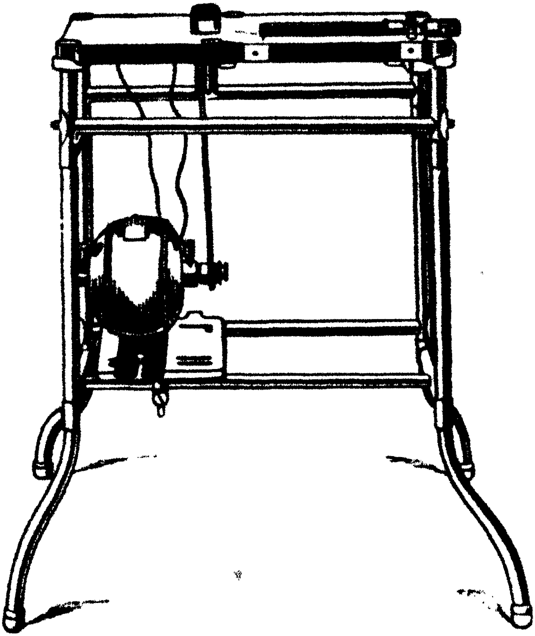
THE PRINTING INK ATTACHMENT.

With this attachment, the machine becomes a perfect printing press, and will produce high-class work in one or more colours. (*See* Specimen Page printed on the Gammeter.)



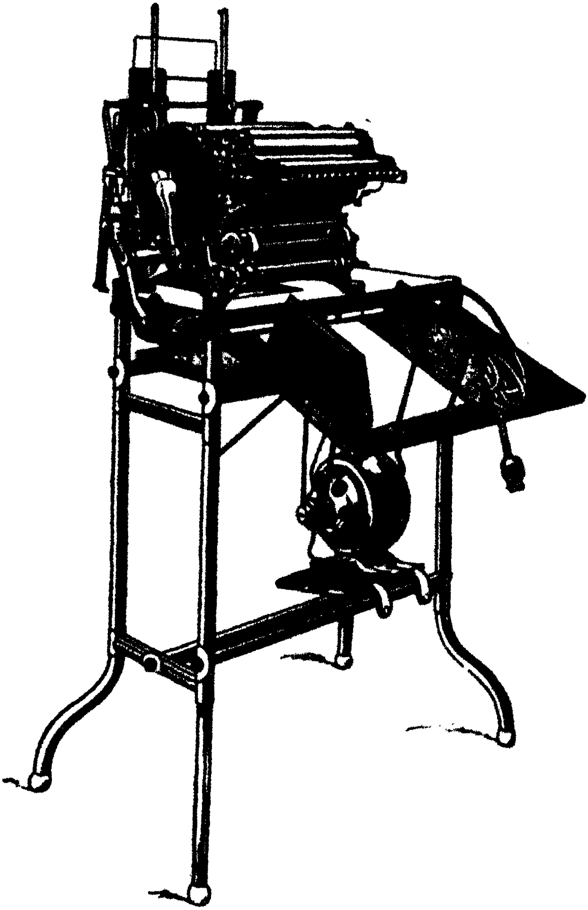
THE SIGNATURE DEVICE.

By this device, the machine is enabled to produce letters with the signature in any colour *at one operation.*



THE ELECTRIC POWER DEVICE.

This increases the output, and for the full printing outfit is essential; it gives speeds of 2,000, 4,500, and 6,000 per hour, making a complete unit thus—



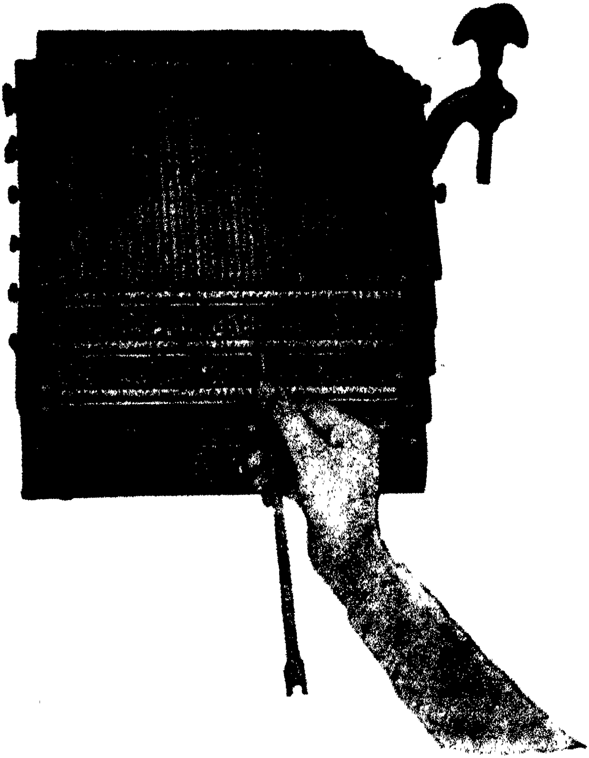
With this complete unit and the use of electrotypes, stereotypes, and ordinary printers' type, practically all the facilities of a modern printer are given.

THE RONEOTYPE

Roneo introduced the Roneotype in 1908, which has since undergone many important improvements, and several models suitable for various requirements are now made.

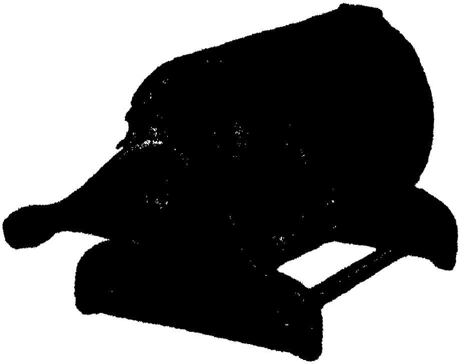
SETTING UP AND DISTRIBUTION OF TYPE.

This is done on a separate machine, which enables two or three people to work on the outfit at once. The principle by which the type is set is by means of a "Gravity Fount," as shown below.



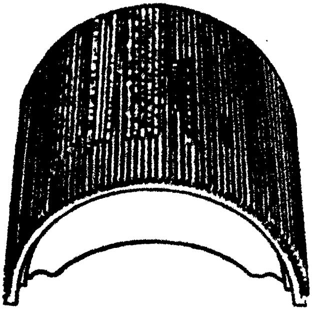
SETTING UP TYPE.

The types are slotted and are arranged alphabetically, and when the end of the composing fork is placed in the type groove, one type falls into the fork and slides to the other end of the fork. The fork is then placed in the grooves of the required letters until the line is complete. The whole line is then transferred into a groove on the flexible cylinder.



COMPOSING DRUM.

With practice, about two lines of an ordinary letter can be set up per minute; but mistakes should be avoided, as the part of the line in which an error occurs has to be passed into the fork, the wrong letter extracted, and the correct letter or letters inserted. The type has, of course, to be displayed over the drum as required.

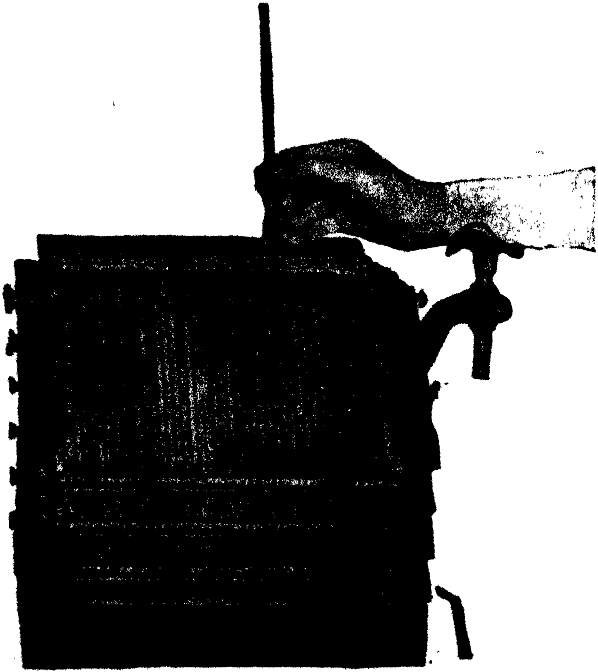


PRINTING.

When set up, the flexible cylinder is transferred to the printing machine. The running off is then much on the same lines as the Roneo stencil duplicator—the inking or ribbon being the main difference.

DISTRIBUTING THE TYPE.

Stock letters or compositions which may be required again can, of course, be retained. The type is re-distributed by sliding a line from the drum into the distributing fork, which is then placed at the top of each groove, and the letters drop back into the fount.



DISTRIBUTING THE TYPE.

INDEX

Autographic signature 9
—— stencil paper 6, 60
Automatic Cyclostyle 63
—— feeding devices, faults of. 45

Backing sheet, where to tear off 20
Blotting books 22, 55
Bookwork 30
Brushes 29

Cards for card indexes, etc. 12
Clay processes 64
Cleaning typewriter 2
—— duplicator 43
Collecting tray 46
Colours, duplicating in various 35, 59, 64
Composition duplicators 64
Convex Flat Duplicator 66
Copying Press for Duplicating 66
Correcting the stencil 13
—— fluid 13, 26
Creasing of paper 45
Cross-hatching 12
Cutting the stencil 7
Cyclostyle 61

Delivery slips 24
Developing fluid 29
—— the stencil 20

Dotted lines 11
Duplicating processes . . . . *Preface*
of . . . .

Rotary Duplicator 56
—— Self-rising Duplicator 63
Envelopes 23

PAGE

FEEDING-DEVICES, faults of 45
Flat duplicators 59
Forms, tables, and tabular work 9

GAMMETER 69, 71
Gestetner Rotary Cyclostyle 47
Glazed paper, use of 22, 28
Grapholithic 68
Grafting 14
Guillotine 40

HANDWRITING 60
Hektograph 64

IMPRESSION roller working stiff 55
Inks 25
Ink stains on fingers, etc. 26
—— supply on machine. 22
Inking of machines 44
Interleaving blotting books 22, 55

JOB SLIPS 3

LENGTHENING the stencil 19
Linen pads 44
Lines, thin 10
——, medium. 10
——, thick 10
——, dotted 11
——, perforation 11
——, music 11

MAPS 11, 61
Materials for machines 25
Mimeograph 61
Multi-colour duplicating 35, 59, 64
Multiple duplicating 34
Music lines 11

NEO-CYCLOSTYLE 61
Number of copies to duplicate . . . . . *Preface*
—— —— obtainable 22

PAGE
"O's" punched out 20
Obliterine 18, 26
Octavo-size work 34
Overprinting 36

PAMPHLET work 30
Paper 28
——, creasing of, in machine 45
——, imperfect feeding of 45
—— sticking to drum 46
——, waste, utilisation of 37
Perfect registration 23, 59
Perforation lines 11
Plex 67
Post cards 23
Printing in various colours 35, 59, 64
—— several copies at once 34
—— on both sides of paper 31
Printypes 2
Protecting varnish 13, 26
Punched out "o's," "c's," etc. 20

REGISTRATION of the printing 23, 59
Retaining stencils 23
Roneo 50
Roneotype, The 69, 78
Ruling the wax 10
Running off the stencil 19

SHORTENING the stencil 19
Signature 9
—— inks 26
Silk sheet, use of 7
—— —— for ruling 10
—— —— for drawing 12
Skeleton letter work 37
Sketches 11, 61
Slips, duplicating of 34
Steel plate 60
Stencil cutting 7
——, lengthening of 19
——, shortening of 19
—— paper 4
autographic 6, 60

PAGE
Stencil, carbofilm 6
—— for flat duplicators 60
Stylus 9
—— for ruling thick lines 11
—— for drawing 12
—— for autographic stencil work 12, 60
—— writing plate 10

TABLOGRAPH 68
Tabular work 9
Type-setting duplicators 69
Typewriter 1
——: styles of type 1
——, long carriage machine 2
——, cleaning 2
Typing, length of 8
——, touch of 8

VARNISHES 13, 26

WASTE PAPER, utilisation of 37
Wax, The 4
Wire-stitching machines 41, 42

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